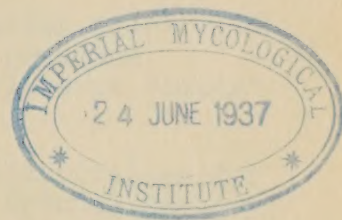


DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
EXPERIMENTAL FARMS BRANCH



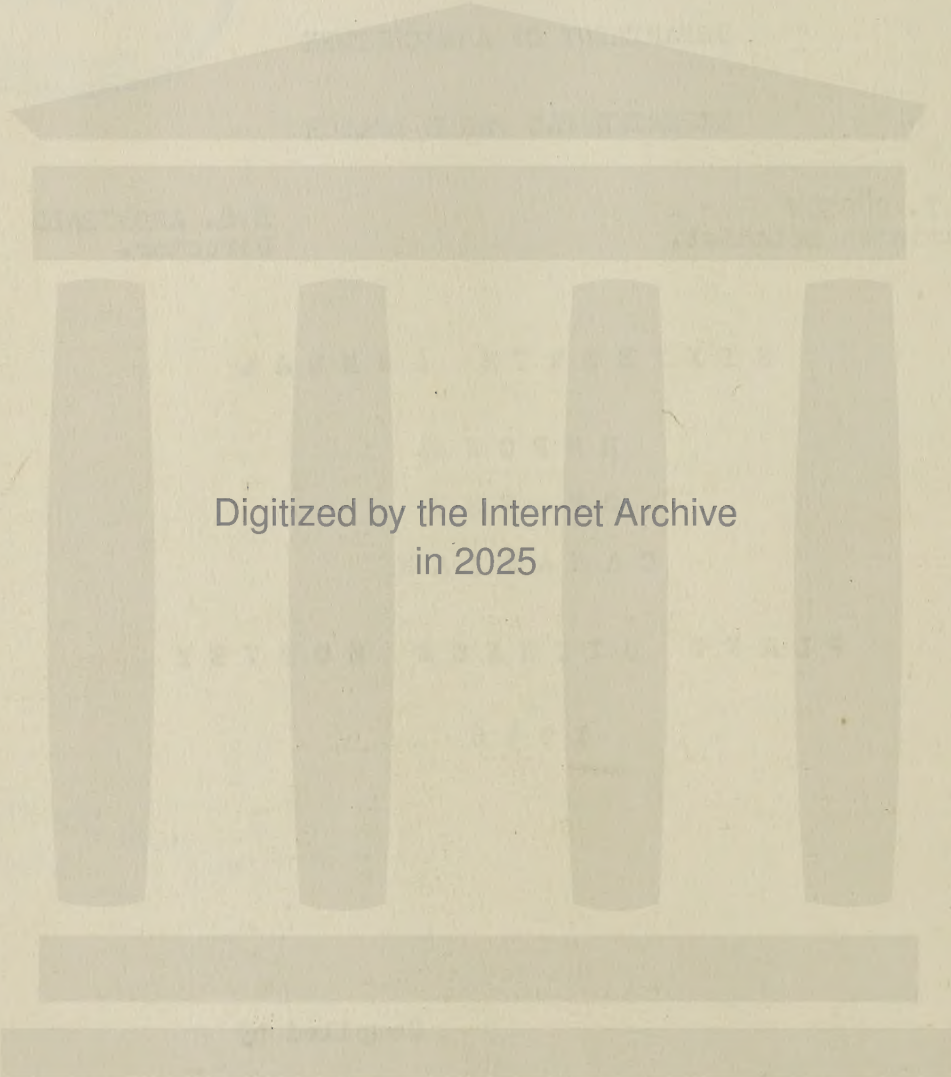
H.T. GÜSSOW
Dominion Botanist.

E.S. ARCHIBALD
Director.

SIXTEENTH ANNUAL
REPORT
OF THE
CANADIAN
PLANT DISEASE SURVEY
1936

*Low and Gussow p. 11.
White p. 5*

Compiled by
I.L. Conners
Plant Pathologist.



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FOREWORD

The Sixteenth Annual Report of the Canadian Plant Disease Survey does not differ in plan from previous reports. The section on "Diseases of Miscellaneous Plants" is omitted as in 1935.

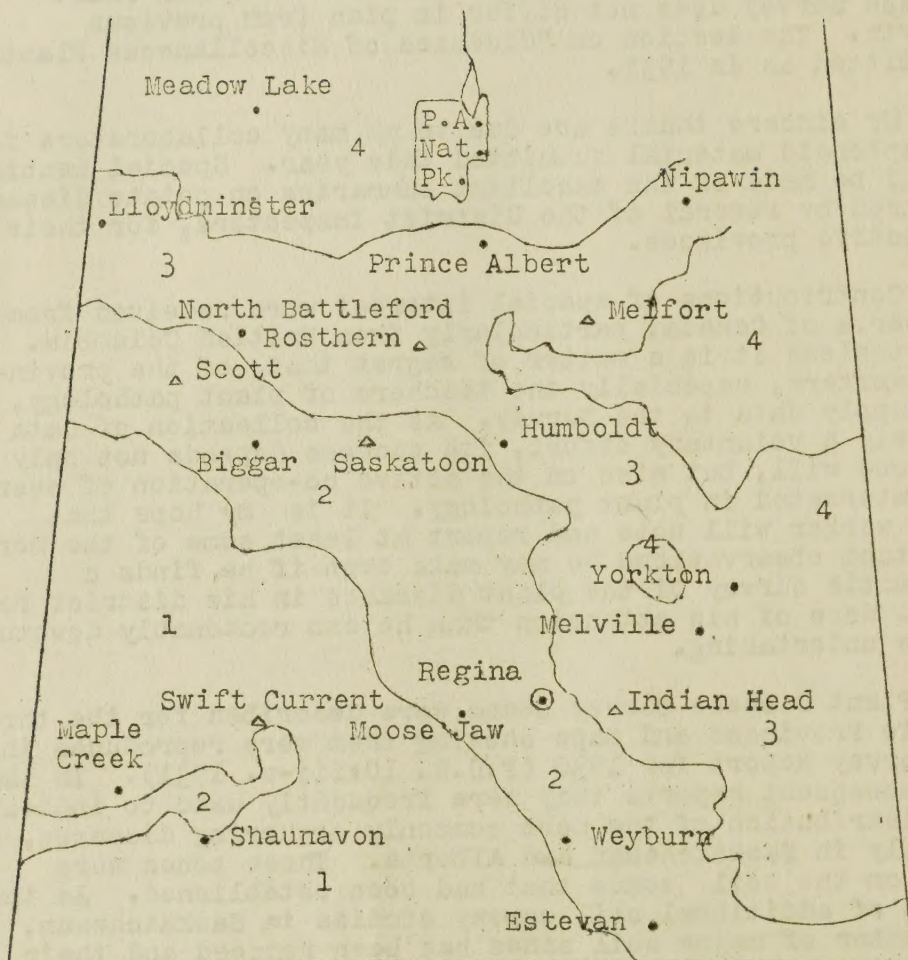
My sincere thanks are due to my many collaborators for the splendid material submitted this year. Special mention should be made of the excellent summaries on potato diseases prepared by several of the District Inspectors, for their respective provinces.

Contributions of special interest were received from all parts of Canada, particularly from British Columbia. Nevertheless it is a matter of regret that, of the provincial workers, especially the teachers of plant pathology, so few supply data to the Survey. As the collection of data is entirely a voluntary effort, its success depends not only on the good will, but also on the active co-operation of every one interested in plant pathology. It is my hope that every worker will note and report at least some of the more important observations he may make even if he finds a systematic survey of the plant diseases in his district requires more of his attention than he can reasonably devote to the undertaking.

Plant Disease Survey zones were described for the three Prairie Provinces and maps showing them were reproduced in the Survey Report for 1930 (P.D.S. 10:iii-v. 1931). In that and subsequent reports they were frequently used to indicate the distribution of the more commonly occurring diseases, especially in Saskatchewan and Alberta. These zones were based on the soil zones that had been established. As the result of additional soil survey studies in Saskatchewan, the number of major soil zones has been reduced and their boundaries have been re-drawn. Upon the suggestion of Dr. R. C. Russell, the plant disease survey zones have been made to correspond with these soil zones of the Province and no attempt has been made to subdivide them further. The accompanying map shows the zones.

May 15, 1937,
Division of Botany,
Central Experimental Farm,
Ottawa, Canada.

I.L. Connors
Plant Pathologist.



Plant Disease Survey Zones in Saskatchewan
based on the major soil zones:

- 1 Brown soils - short grass prairie region
- 2 Dark brown soils - intermediate prairie region.
- 3 Black soils - tall grass "park" region
- 4 Grey soils - wooded region
- △ Experimental Farms and Stations

New or Noteworthy Diseases

Stem rust of wheat caused but slight damage in Western Canada in 1936. Due to its initial appearance a week earlier than in 1935 with weather favourable for rust development during the last two weeks of June, there was sufficient inoculum present in Manitoba to produce a destructive epidemic. However, after that date, weather conditions were unfavourable for rust development. All cereal crops in southern Manitoba ripened prematurely, in fact frequently dried up, and rust made little progress. Further north, where the rainfall and temperature was more nearly normal, it did some damage, but it was largely obscured by the greater damage caused by drought and heat. Stem rust caused little injury elsewhere in Canada.

In a recent paper (Ann. Mycol. 34:257-260. 1936) T. Petch states that the name Gibberella Saubinetii (Mont.) Sacc. is a synonym of Gibberella cyanogena (Desm.) Sacc., a common saprophyte on herbaceous and woody stems. The correct name of the Gibberella on cereals is Gibberella Zeae (Schw.) Petch (Sphaeria Zeae Schw.).

From the limited information to hand, it appears that Thatcher, a new rust resistant variety of wheat, may be more susceptible to ergot (Claviceps purpurea) than the varieties of bread wheat commonly grown in Western Canada. It may be recalled that durum wheats as a class are decidedly more susceptible than common wheats.

Since the discovery of the oat nematode (Heterodera schachtii) in Ontario in 1934, the original infestation in Simcoe and Ontario counties has been increasing in intensity. The seriousness of the problem has been further emphasized by the discovery of another infestation in Waterloo county.

Twist (Dilophospora Alopecuri) was found fairly generally distributed on Vancouver Island and in the Fraser Valley, B.C. on velvet grass (Holcus lanatus). It has been recorded only once before in Canada, when it was collected on barley at Carlyle, Sask., in 1924.

Alfalfa plants apparently affected with bacterial wilt (Phytomonas insidiosa) were found at the Experimental Station, Windermere, B.C. Although it is present in the Pacific Northwest States, it is a disease new to Canada.

Bacterial wilt and tuber rot (cause undetermined) was again destructive in Quebec. The disease was first detected in 1931 (P.D.S. 11:49) and was most severe in 1934. It is not known to occur elsewhere in Canada, but Reiner Bonde

(Phytopath. 27:106-108. 1937) recently described a similar disease in Maine. A newly described leaf spot (Cladosporium pisicola) of pea was found at Salmon Arm, B.C. and a leaf spot (Ramularia Rhei) apparently new to North America was collected on rhubarb at High River, Alta.

A rust (Pucciniastrum Epilobii) previously recorded in North America in Alaska on Godetia and Clarkia is now known on Godetia across Canada from Alberta to P.E.I., and recently was found on Clarkia in a greenhouse at Ithaca, N.Y. Another rust (Coleosporium Campanulae), new to Canada, was collected on Campanula persicifolia in Vancouver, B.C. A leaf spot (Gloeosporium mezereum), new to North America, caused considerable defoliation of Daphne mezereum in British Columbia. Fusarium avenaceum, a common pathogen of cereals, caused severe foot rot in stocks at Ottawa, Ont., and Lennoxville, Que.

A new apple rot caused by Gloeosporium allantoides Peck was found at Fredericton, N.B. For this pathogen Dr. Dearness has erected the genus Dasycarpoma. Apparently a new virus disease of red raspberry tentatively named Yellow Blotch was found in Ontario in 1935.

Previous to 1936 it was shown that brown heart of turnip could be controlled by the application of boron to soils on which turnips were subject to the disorder. This year, the reports indicate continued success in the Maritime provinces in the control of brown heart by the use of boron. In addition, another important non-parasitic disease, drought spot and corky core of apple, has been successfully controlled in the Okanagan Valley, B.C., by the application of boron (H.R. McLarty, Scientific Agriculture 16:625-633. 1936). It is estimated that 40,000 boxes of perfect fruit were added by this means to the 1936 harvest of the Okanagan growers. A yellowing of alfalfa, common in spots or in whole fields in the Okanagan and Kootenay Valleys, has also been observed to be due to the lack of boron.

Cephalosporium wilt, a native disease of elm, was found in Nova Scotia. This is the first report of its occurrence in Canada. Recent investigations in the United States, indicate that it is not an uncommon disease.

Scab (Fusicladium saliciperdu) was severe through the Maritimes and eastern Québec. It was more destructive in the Annapolis Valley, N.S., than it has been since 1928. The disease is now known as far west as Louiseville, Que., nearly 25 miles west of Three Rivers.

The Weather and Its Influence on Plant Diseases

Spring growth commenced about the same time this year as in 1935 in the coastal section of British Columbia. The temperatures were very similar during the two years, but there was considerable variation in the monthly rainfall. During 1936, most of the common diseases were general and more severe than in 1935. Their greater prevalence was attributed to the heavier rainfall in the months April to July in 1936 as compared with the corresponding months of last year. Severe losses were sustained from blossom blight and brown rot of stone fruits, and splitting of sweet cherries; grain rusts, late blight of potato and the downy mildews were more abundant. On the other hand, March was drier this year than last, which probably retarded the development of tulip blight during the earlier stages of growth. The disease, however, spread rapidly in May in some fields where sanitary precautions were not taken. In the Okanagan valley the winter was exceptionally severe with heavy falls of snow in January and February. Both apricot and peach suffered from the low temperatures in February. Spring was very late with heavy rains for this district. The months of May, June, and early July, were also wet, while the latter part of the summer was dry with high temperatures. Fire blight was unusually prevalent. The fall was mild and exceptionally dry.

Snow fell early in Alberta from Calgary northward, it was unusually heavy and in the North, remained late in the spring. On account of its early arrival, the ground was scarcely frozen at Christmas and the frost penetrated but a short distance. In the south the fall of snow was considerable, but most of it had evaporated by late winter. The soil moisture at seeding time south of Calgary was ideal, but there was little in reserve. Where the snow had persisted the soil was unusually wet, making the season one of the latest for seeding. In Alberta, south of Lacombe-Vegreville-Lloydminster, the grain made rapid growth throughout the seedling stage, but as practically no rain fell during June, July, and August, the yields were very low, except in the irrigated districts. North of this scarcely any rain fell, but there was sufficient reserve moisture so that good yields and well matured grain were harvested.

Seeding began late (after May 1st) in many parts of Saskatchewan, notably the northeastern and west central districts. Portions of the south central district were about 70 per cent seeded on May 4. About 12 per cent of the wheat

acreage of the province was seeded on this date. Moisture conditions varied greatly over the province. Generally, the surface moisture was good due to late snows, but subsoil moisture was very scarce in the southwestern and west central Sask. The weather during the first two weeks in May was cool and growth was slow. Killing frosts occurred at some points on May 19th. Warmer weather including three days of extreme heat at the end of the month promoted rapid growth of early sown wheat. Lack of rain to replace the moisture caused deterioration of the growing crops and poor germination of the late grains. A very small amount of soil drifting occurred in patches on high light land, but taking the province as a whole, the damage was not great. Soil temperatures during May were higher than in 1935, but lower than in 1934. Rainfall amounted to 1.24 inches which was well distributed. This was heavier than in the two previous years.

Cool weather during the first week in June followed by rains over most of southern Sask. checked, to a very large extent, crop deterioration which had set in due to extremely high temperatures and lack of rainfall in late May. Growth was slow and late crops patchy, due to uneven germination and growth. Drought became serious in Southern and Western Sask. Only a few places reported damage from soil drifting. The last 10 days of the month brought warmer weather but very little rainfall. The total rainfall for the month was 2.61 ins. This was much lower than that of the same month in 1934 and 1935. Soil temperatures were slightly higher than in those years. The lack of moisture very likely controlled browning root rot of wheat which did very slight damage.

Hot weather and drought continued to damage the crops throughout July. Very little rain fell over the province, except in one or two localities. The deterioration which followed this continued drought masked the effect of root rots and no doubt checked them somewhat. Stem rust appeared early this year. Traces of it were found on July 8th at Saskatoon and on July 2nd in the Weyburn area. The disease made little progress except in portions of south central Sask. (zone 2) and east central Sask. (zone 3). Continued dry weather and heat in the rest of the province prevented its spread. Rainfall at Saskatoon during August amounted to .98 ins. which was much below average. Soil temperatures were slightly higher than average.

The weather conditions in Manitoba are described in some detail under Stem Rust of wheat. The crop was later than usual and moisture and temperature were favourable for rust development during the latter part of June. However,

all of July was hot and dry and stem rust made little headway. Instead, the crops ripened prematurely and only in the northern part of the agricultural area did rust cause any damage.

The 1936 season was generally hot and dry in the Niagara Peninsula of Ontario. It was unfavourable for the development of apple scab, peach leaf curl, brown rot of stone fruits, which are usually important in the fruit district. Late frosts in May did some damage to strawberries, but were particularly injurious to grapes causing considerable reduction in crop in localized areas.

The extreme and record hot spell of early July caused much loss to bush fruits and truck crops. Maturing small fruit suffered sun scald or dropped off, resulting in a crop failure. Wilt diseases appeared to be more prevalent and were probably favoured by the heat and drought.

The winter of 1935-36 was comparatively mild in New Brunswick. Despite the earliest break-up on record, spring was delayed due to cool dull weather and heavy rainfall. Considerable damping off occurred in early plantings of beets and mangels. An unusually heavy ascospore discharge of Venturia inaequalis began on May 1st and in consequence, apple scab was more prevalent than usual. A killing frost on May 16 caused considerable injury to the tender foliage. Rainfall was half an inch below normal, but well distributed. The growing season, unlike the previous year, was not marked by extremes of heat or drought. Late blight was reported the last week of July and although it was effectively held in check by dry weather in August, conditions were favourable in September for its development. As a result, it caused greater losses in 1936 than it has for several years. Due to wet weather in late September and in October difficulty was experienced in some districts in harvesting the grain and potato crops.

Weather conditions in the Annapolis Valley, N.S. were decidedly abnormal in 1936. March was extremely warm and wet, the mean temperature being that normal for April and the precipitation nearly equal the maximum for that month. April was practically normal, the rainfall being 2 inches less than the previous month. Growth started early, but slowed up during May. Ascospores of the apple scab fungus (Venturia inaequalis) were liberated from the perithecia three weeks earlier than usual. Very heavy discharges took place from the time the buds had reached the green tip stage until after the flowers had bloomed. Spraying was

retarded by wet soils in the early season and winds and rain later on prevented satisfactory timing of applications. Temperatures of 23°-28°F. during the period of early bloom caused considerable bud and blossom injury and reduced the crop. Late varieties were the least injured. September and October were wet and very favourable to the spread of late scab infection. Storage scab was evident before December 1, 1936. Early frosts during harvest further reduced the marketable crop. Temperatures as low as 18°F. were reported by some orchardists. Rainfall for September and October was 5.6 ins. above the 20-year mean. The 1936 season was not favourable to good apple production.

The winter of 1935-36 was comparatively mild in Prince Edward Island. Ample protected by a heavy covering of snow, most garden and field plants wintered well. The weather was mild from early March. As a result growth began at that time only to receive a set back by cold weather in April and May. Early June was seasonable except that the last two weeks were unusually wet. Rots of garden plants due to Sclerotinia and Botrytis became markedly prevalent. In July, which was cloudy, rusts and leaf spots became general. The first part of August was cool and rainy and favoured further spread of these diseases, so that some were severe by the end of the month. Wheat was damaged by leaf rust and to a much lesser extent by a root rot caused by an undetermined fungus.

Late blight of potatoes first appeared at Charlottetown on July 28 and it occurred generally over the Province by Aug. 15.

Potatoes suffered some low temperature injury when the temperature fell to 26°F. on Oct. 15. This was followed by snow and severe frost on Oct. 27 and 28. Large quantities of unharvested turnips and mangels were affected.

RECORDING PHENOLOGICAL DATA

R. C. Russell

Last year I was delegated by the Sub-Committee on Plant Disease Survey to co-ordinate the collection of phenological records for the year 1936 in the three Prairie Provinces. The following persons helped secure the records compiled in the table below: Peturson, Winnipeg; B. J. Sallans, Indian Head; R. C. Russell, Saskatoon; W.C. Broadfoot, H. W. Cormack, L. E. Tyner and G. B. Sanford, Edmonton.

At the beginning of the past season, we consulted W.P. Fraser and I. L. Connors, and increased the list of species to be observed to about twenty. The records for Saskatoon include several more so that thirty species, all told, appear in the accompanying table. In all cases, the dates in column (a) show when the first plant was observed in flower, and column (b) shows when the flowers were becoming common.

From our experience in the past two years the following suggestions are offered:-

1. Phenological data are more valuable when taken at the same spot each year and on the same individual plants, where possible, than when taken in different locations from year to year.
2. At each recording centre the plant species selected for observation should be ones which can be kept under daily observation. This, I believe, is more important than having the same list of species observed in all three provinces. For example, of the 30 species listed in the table of 1936 observations, I can observe 21 species right on the University Campus on my way to and from work. I feel surer of the records in connection with these than I do of the ones which I have to go to the country to obtain.
3. More exact results are apt to be achieved if one person makes all of the observations in any one district.
4. Plants may be considered in bloom as soon as they commence to shed pollen. Obviously they should be recorded at the same stage each year.
5. Of the two observations made on the same species, i.e. (a) time of first flower coming into bloom, and (b)

Summary of Phenological Data taken at
Winnipeg, Indian Head, Saskatoon and Edmonton, 1936

	Winnipeg		Indian Head		Saskatoon		Edmonton	
<i>Pulsatilla ludoviciana</i>	-	22/4	-	5/5	24/4	2/5	7/5	15/5
<i>Populus tremuloides</i>	1/5	5/5	-	5/5	27/4	2/5	10/5	15/5
<i>Phlox hoodii</i>	-	-	11/5	15/5	8/5	9/5	-	17/5
<i>Acer negundo</i>	11/5	13/5	15/5	12/5	11/5	13/5	12/5	20/5
<i>Betula papyrifera</i>	12/5	15/5	-	-	13/5	18/5	2/6	3/6
<i>Hierochloa odorata</i>	20/5	22/5	-	-	18/5	19/5	18/5	22/5
<i>Amelanchier alnifolia</i>	19/5	21/5	19/5	-	17/5	20/5	15/5	20/5
<i>Smilacina stellata</i>	24/5	28/5	-	-	22/5	25/5	-	-
<i>Thermopsis rhombifolia</i>	-	-	-	28/5	15/5	20/5	-	-
<i>Viola canadensis</i>	-	-	-	3/6	22/5	25/5	-	-
<i>Elaeagnus commutata</i>	4/6	7/6	3/6	8/6	30/5	6/6	1/6	7/6
<i>Anemone canadensis</i>	8/6	11/6	3/6	13/6	5/6	12/6	-	20/6
<i>Achillea lanulosa</i>	-	30/6	13/6	18/6	11/6	15/6	22/6	30/6
<i>Diholcos bisulcatus</i>	-	-	-	-	10/6	15/6	-	-
<i>Rosa (alcea?)</i>	-	-	20/6	25/6	18/6	27/6	-	24/6
<i>Bromus inermis</i>	17/6	26/6	24/6	29/6	23/6	2/7	20/6	30/6
<i>Campanula petiolata</i>	-	26/6	23/6	29/6	19/6	29/6	12/6	-
<i>Oenothera (strigosa)</i>	-	-	29/6	4/7	3/7	15/7	-	-
<i>Lactuca pulchella</i>	-	19/7	5/7	9/7	26/7	1/8	-	-
<i>Psoraleidium argophyllum</i>	-	-	-	-	9/7	14/7	-	-
<i>Spiraea alba</i>	-	-	27/6	4/7	27/6	6/7	-	-
<i>Steironema ciliatum</i>	-	-	3/7	6/7	4/7	10/7	-	-
<i>Grindelia perennis</i>	-	13/7	17/7	28/7	26/7	10/8	-	-
<i>Oligoneuron canescens</i>	30/7	8/8	-	-	28/7	10/8	7/7	10/7
<i>Aster crassulus</i>	-	-	16/7	4/8	5/8	8/8	-	-
<i>Aster laevis</i>	-	-	1/8	7/8	10/8	12/8	-	-
<i>Cirsium undulatum</i>	-	27/6	4/7	13/7	-	-	-	-
<i>Prunus pennsylvanica</i>	-	-	-	-	-	-	20/5	28/6
<i>Lilium philadelphicum</i>	26/6	27/6	-	-	-	-	20/6	-
<i>Hedysarum boreale</i>	-	-	-	-	-	-	9/6	-

time when the flowers are becoming common, the former is perhaps the more exact.

6. In looking over the table of observations for all places in 1936 it appears that some of the species listed are difficult to find at one or more of the places, but the last three in the list do not necessarily come under this category as we were not attempting to record them at Indian head and Saskatoon. If asked to select from the list the fifteen species best suited to our purpose at Saskatoon, I would choose the following:

24/4	<i>Pulsatilla ludoviciana</i>	5/6	<i>Anemone canadensis</i>
27/4	<i>Populus tremuloides</i>	10/6	<i>Diholcos bisulcatus</i>
8/5	<i>Phlox hoodii</i>	18/6	<i>Rosa</i> (? <i>alcea</i>) (low species on open prairie)
11/5	<i>Acer negundo</i>		
15/5	<i>Betula papyrifera</i>	27/6	<i>Spiraea alba</i>
17/5	<i>Amelanchier alnifolia</i>	9/7	<i>Psoraleidum argophyllum</i>
22/5	<i>Viola canadensis</i>	26/7	<i>Grindelia perennis</i>
30/5	<i>Elaeagnus commutata</i>	10/8	<i>Aster</i> (? <i>laevis</i>) (purple).

7. I am not in favor of adopting a standard list that cannot be altered to suit conditions at the different places, particularly until we have had one or two more years experience in gathering this data. Of the 30 species appearing in the table for 1936 about eight were additional ones observed in Saskatoon only. Probably a total of 15 species as a final selection would be sufficient for each place.
8. I shall be glad to receive the suggestions, of all others interested in this work, re suitable species, number to be observed, improvement of method, etc.
9. The longer accurate data are taken the more valuable the records become.

Note: At the meeting of the Associate Committee on Field Crop diseases held in Winnipeg, Man., April 5-8, 1937, a resolution was passed requesting that future Plant Disease Survey Reports contain summaries of the Phenological Data now being collected in the Prairie Provinces. On account of its interest Dr. Russell's paper before that meeting has been given in full.-

- I. L. Connors.

I. DAMAGES OF CEREAL CROPS

WHEAT

STEM RUST (*Puccinia glumarum*) was very prevalent on the lower mainland of B.C.; the average damage was estimated to be 10%. In the rust nursery rows at Agassiz, it was severe on Marquis and Reward, but none was found on H 44 x Reward R.L. 975-1, Hope and Kubanka.

Stem rust was observed on July 2 at Indian Head, July 8 at Saskatoon, and July 15 in the northerly sections of Saskatchewan. The average infection was 5% in zone 1, 4% in zone 2, 9% in 3, and 4% in 4.

In 1936, stem rust of wheat made its appearance in Manitoba a week earlier than it did in the severe rust year of 1935. The first stem rust infections were observed at Londen, on June 25, and at that time, primary infections were just breaking out on about 5% of the stems of common wheat in the southern part of the Red River Valley. The early and widespread occurrence of primary infections was no doubt due to the advent of a general rust-spore shower over Manitoba during the latter part of the second week in June and to weather conditions favourable to rust development during the third and fourth weeks of June. By the end of the month stem rust of wheat was known to be present throughout all of Manitoba south of a line east and west through Neepawa. At that time the crop was slightly later than at the corresponding date in 1935 and there was sufficient inoculum present in Manitoba to produce a destructive rust epidemic given weather favourable for infection and development of rust. However, weather conditions were unfavourable for rust development during all of July and rust progressed very slowly particularly in the southern half of the agricultural portion of the province where, in general, rainfall was scanty or even practically absent in some localities and temperatures excessively high. The whole area south of the main line of the Canadian Pacific Railway suffered during July from excessive heat and drought. All cereal crops in that region ripened (in many cases dried up) prematurely and rust made but little progress there. The severity of rust infection on common wheat in this area ranged from a trace to 30% and rust damage was negligible. In the area north of the main line of the Canadian Pacific Railway and south of the Riding Mountains, the deficiencies in rainfall and excesses in temperature were less than in the southern areas and crops were considerably heavier and rust more prevalent. The severity of rust infection in this area ranged from slightly more than a trace on the earliest ripening crops to 5% infection on late crops. Most of the crops in this area ripened early and escaped appreciable rust damage and only about 2% of the wheat carried infections of 40% or more. There was undoubtedly some damage caused by rust in this area, but it was largely obscured by the greater damage caused by drought and heat.

Only a trace of stem rust developed on durum wheat at any time in Manitoba.

In general, weather conditions favoured the rust organism during the early part of the season. Southerly winds which prevailed during the early part of June over the Great Plains region brought spores northward into Manitoba. Normal temperatures prevailed throughout the month and sufficient moisture in the form of rains and frequent dews favoured spore germination. However, a decided change in the weather occurred towards the end of June and from that time until the end of the growing season, the weather was unfavourable for rust development. Throughout the agricultural region of Manitoba the deficiencies in rainfall for July ranged from 50 to 75%, while temperatures were on the average about 9°F. above normal and in some localities in the southern parts of the province excesses in temperature of 14°F. occurred. During all this month dew formation was very infrequent and light. The progress of the rust which had become so well established in Manitoba in late June, was effectively checked by the lack of moisture during July, and by the excessive heat which hastened maturity of cereal crops by about two or three weeks, thus shortening the period of exposure to the rust.

Rainfall was fairly generous throughout the whole growing season in the portion of Manitoba lying north of the agricultural area and cereal rusts were observed on Hordeum jubatum and cereals in some of the settled localities in that region. Dr. Margaret Newton found stem rust on H. jubatum and barley at The Pas, Man., on August 15. The severity of infection ranged from a trace to 25% on barley. On August 17, Dr. Newton found a trace of stem rust of wheat on H. jubatum and common wheat at Churchill, Man., and, on the following day, she found stem rust on H. jubatum, wheat, and barley at Wabowden, Man., a distance of 300 miles north of Winnipeg. At that point the average severity of infection was 25% on wheat, and 15% on barley. (B. Peturson)

Stem rust infection was severe at Ste. Anne de la Pocatiere, Que., late in the season and probably caused some reduction in yield. It was also general and very severe at the Cap Rouge Station. It was moderately infecting winter wheat on July 11 at Ste. Anne and traces were present on Garnet and Brock at the Lennoxville Station on July 16.

Stem rust was fairly prevalent in the variety plots at Fredericton, N. B., on August 4. Typical readings were Garnet, 25%; Mindum, 20%; Huron, 5%; Marquis, trace; Thatcher, 0; and R. L. 716, 0. A 60% infection was noted in a field of Garnet near Fredericton on August 5, and a trace on wheat at Doaktown on Aug. 6.

Only a trace or a slight infection of stem rust was found in the variety plots at Nappan and Kentville, N. S.

Traces of stem rust were first found in P. E. I. on July 23, and became very destructive, particularly in fields where the seed was sown late.

LEAF RUST (*Puccinia triticina*) infection was severe on Little Club; moderate on H 44 x Reward R.L. 975-1; and trace on Marquis, Reward, and Hope in the rust nursery rows, Agassiz, B.C. Infection was moderate in a field of Jones Fife at Grand Forks.

Traces of leaf rust were observed on some of the varieties at Lacombe Station, Alta. Infection was a trace to very light in zones 1 to 3 in Saskatchewan.

Leaf rust was general throughout Manitoba, but it caused very little damage.

Leaf rust infection was severe on Reward, Red Fife and Garnet; and moderate on Reliance, Canus, Brock M.C., Huron and R.L. 716 in the plots at Lennoxville, Que., on July 17. The infection was moderate in the plots at Ste. Anne de la Pocatière. However, only 1% was noted on R.L. 1000 and R.L. 729. Traces only were found in Bonaventure county in early August.

In the plots at Fredericton, N.B., Thatcher, the new stem rust resistant variety, was very susceptible to leaf rust, while R.L. 729, R.L. 1005, and others were highly resistant. R.L. 716 contains susceptible and highly resistant plants in about equal proportions to judge by the amount of rust on individual plants. It was also observed that where a variety is highly susceptible to leaf rust, the sheaths are rusted, but to a lesser degree. It is suggested that the percentage infection found thereon may serve as an index to the susceptibility of the variety when it is impossible to estimate the infection on the blades late in the season on account of their shrivelled condition. Where the sheaths showed 10 to 20% infection the blades were moderately to severely rusted. Field infections recorded were: Fredericton, 5% on sheaths of Garnet; Nashwaak, 20% on sheaths; Doaktown, 40% on leaves. (I. L. Connors)

In late July leaf rust infection was severe on susceptible varieties at Nappan, N.S. and moderate at Kentville. Only traces of leaf rust were seen in fields where at that time the crops were just heading.

Leaf rust infection was moderate to severe in the plots at Charlottetown, P.E.I. It appeared early and continued in

great abundance throughout the growing season. The infection was general, causing considerable shrivelling of the lower leaves. It was also thought to have caused stunting of the plants in many sections. (E.H. Saunders)

STRIPE RUST (Puccinia glumarum) was abundant in the Gordon Head district, near Victoria, B.C.; the damage was a trace.

BUNT (Tilletia caries and T. laevis). Dr. W.F. Hanna has again supplied a summary on the bunt situation in Western Canada, prepared from the records of the Western Grain Inspection Division.

Table 1. Wheat Bunt in Western Canada

Summary of Inspections in Western Canada from Aug. 1, 1936 to Oct. 31, 1936.

Class of Wheat	Cars Inspected	Cars Graded Smutty	Percentage Smutty
Hard Red Spring	68,573	529	0.8%
Amber Durum	5,749	43	0.7
White Spring	16	0	0.0
Alberta Red Winter	38	4	10.5
All Classes	74,376	576	0.8%

There is little change in the prevalence of bunt over previous years (see P.D.S. 15:4. 1936), there being a slight increase in Hard Red Spring Wheat, which was offset by a decrease in other classes.

Bunt was recorded in 2 fields out of 239 examined in Sask., as follows: Parkbeg, 2%; Indian Head, 6%.

In N.B., the following summary on the prevalence of bunt was prepared by Mr. O.C. Hicks, Prov. Dept. of Agriculture: Bunt is found in the counties of Kent, Gloucester, and Madawaska. In Kent county, out of 70 fields inspected, 15 showed the presence of bunt; in one 50% of the heads were affected. In Gloucester county, about Caraquet and on the Islands of Shippigan and Miscou, bunt is very prevalent. In Madawaska the percentage of grain affected is somewhat lower. In the other counties, little or no bunt is found, due to the practice of seed treatment.

Very little bunt was found this year in P.E.I.; traces caused by T. laevis were recorded in a field in Queens county.

LOOSE SMUT (Ustilago Triticici) was recorded in Sask., in 32 fields out of 207 examined or 15.4%, with an average infection of slightly more than a trace. In Man., loose smut was found in 8 fields of Ceres, average infection 0.5%; in 6 fields of Reward, average infection 3.2%; and in one each of Garnet, infection 1.5%, Marquis, a trace; and Curum a trace.

A light infection of loose smut was present in the fields of the Experimental Sta., Ste. Anne de la Pocatiere, Que., where the seed was treated by the hot water method, but on other farms in Kamouraska and L'Islet counties, infection varied from 3 to 12%. Similarly, seed from Ottawa, which was untreated, gave a high percentage of smut. A trace was observed at the Cap Rouge Station and a trace to 1% was present in Bonaventure county. This smut occurs generally throughout N.B., infection ranging from a trace to 3%. Traces to 2% loose smut were present at the Nappan Station, N.S. and in fields in the province. Traces to 2.5% were found in P.E.I.

BLACK CHAFF (Pseudomonas (Phytomonas) translucens var. undulosa) was found in 4 fields out of 35 examined in Man.; a trace on Marquis at Neepawa and Winnipeg, slight infection on Thatcher, and moderate on Renown at Souris. A slight infection was recorded on leaves of Marquis in the plots at Ste. Anne de la Pocatiere (4336).

BASAL GLUME ROT (Phytomonas atrofaciens) caused severe damage in a field in zone 11, Alta. It was associated with hail damage. A trace was reported from Dield, Man.

ERGOT (Claviceps purpurea). A trace was present on Marquis in the wheat plots at Laconbe, Alta. A trace was seen in the Plant Pathological plots at Saskatoon and also at Iuenster, Sask. It moderately infected Reward and Thatcher at Winnipeg. Traces were reported in wheat at the Charlottetown Station, P.E.I., and in fields of Red Fife, Huron, and other wheats in Kings county.

A carload of Thatcher wheat, imported in March 1936 from the United States to Regina, Sask., for seed purposes, contained 6 ergots per lb., which was in excess of the maximum of established grades, viz.: one ergot per bushel in registered seed, in certified seed No. 1 and grade No. 1, and 2 per bushel in certified seed No. 2.

GLUME BLOTCH (Septoria nodorum) infections were reported as follows: at Laconbe, Alta., moderate on Velvet Don, light on Timalia, and a trace on Supreme among those grown; at Ochre River, Man., severe; at Doaktown, N.B., slight, and at Nashwaak, severe on August 6; at Fredericton

traces to slight on many varieties on Aug. 29; in P.E.I., traces on Huron and White Fife.

LEAF SPOTS (Septoria Tritici in part) were reported in 35 out of 239 fields examined in Sask.; the damage was a trace in zone 2 and slight in zone 3.

FOOT ROTS. A patchy infection of Take All (Ophiobolus graminis) was observed in Saanich county, Vancouver Island, B.C.

A Seedling Blight (Helminthosporium sativum) was recorded from zone 4, Alta., on June 26. The trouble was associated with alkali patches.

Take All occurred in 5 fields out of 277 examined in Sask.; the damage was a trace. Common Foot Rot (Helminthosporium and Fusarium spp.) was present in 257 fields out of 277 examined or in 92.8%; the average damage was moderate. At the Scott Station on June 27 the variety plots were slightly to moderately affected. The fertilized portion of the rotation wheat-summerfallow, which has been maintained for 25 years, contained more infected plants than the unfertilized; the heavily seeded plots more than those lightly seeded. Manure and fertilizer reduced the amount of foot rot over fertilizer alone. Heavy applications of superphosphate likewise reduced the foot rot. Wheat following brome grass showed more foot rot than wheat following western rye grass or crested wheat grass. When examined on July 30, prolonged drought appeared to mask any differences; all varieties were moderately affected whatever the treatment. Common foot rot moderately affected wheat both in the plots and the larger fields at Swift Current. Pre-Maturity Blight was found in 4 fields out of 96 inspected; the average damage was a trace, but in one it caused 5% damage.

Browning Root Rot (Pythium spp.) was found in 8 fields out of 131 surveyed in Sask.; these were entirely in zones 2 and 3. The average damage was a trace.

Common Foot Rot was reported in 2 fields out of 4 examined in Man.; infection was slight and severe respectively.

A Root Rot (a new but undetermined fungus) caused severe damage to one field of White Fife at Kalpeque, P.E.I. Slight amounts were noted in other fields, but no other damage was observed. (R.R. Hurst)

HEAD BLIGHT (Fusarium spp.). Traces were recorded in the plots at both Ste. Anne de la Pocatiere and Cap Rouge, Que. Traces were also reported in a field of Huron wheat in Kings county, P.E.I.

SPOT BLOTCH (Helminthosporium sativum) caused a trace of infection at Rathwell and Fort Whyte, Man. A slight infection was recorded in the plots at Cap Rouge, Que.

BLACK POINT (Stemphylium sp.) caused a trace of damage in a field in zone 10, Alta.

FROST BANDING was reported from one field in zone 10, Alta., and numerous samples so affected were received from Saskatchewan at the Saskatoon Laboratory. The amount of damage was not recorded.

POWDERY MILDEW (Erysiphe graminis) was abundant at Kentville, N.S., especially in the rust nursery. R.L. 1000 showed only a trace. Traces were observed at Fredericton, N. B.

OATS

STEM RUST (Puccinia graminis) varied from none on Richland and S 339 to severe on Glabrota in the rust nursery at Agassiz, B.C. It was general in the Fraser River valley and delta, the damage being 10% in some fields.

A light sprinkling of stem rust was found in zones 1 to 3 in Saskatchewan; the highest infection was 1% in a field at Regina.

Stem rust was general throughout Manitoba late in the season. No damage resulted except to late crops in the northern areas. It was collected at Wabowden, 300 miles north of Winnipeg.

Traces of stem rust were present in late July or early August at Ste. Anne de la Pocatiere, Que., Kentville, N.S., and Charlottetown, P.E.I. No rust was observed in fields. In late August it was severe at Ste. Anne; infection ranged from a trace to 50% in Kings county, N.S.; and traces to 10% were observed in Kings county, P.E.I.

CROWN RUST (Puccinia coronata) was present throughout Manitoba, but it was much less prevalent than in 1939. It caused no appreciable damage.

Crown rust moderately infected oats at Tarnham, Que.; it was severe at Ste. Anne de la Pocatiere, and Cap Rouge, probably reducing the yield. In early August only traces of rust were observed at Fredericton, N.B., at Kentville and Nappan, N.S., with a slightly greater prevalence at Charlottetown, P.E.I. Nevertheless on that date in one

field, 2 miles north of Fredericton, a 40% infection was recorded, while other fields in the locality showed 1 or 2%. It is suspected that buckthorn bushes were growing in the close vicinity. Later, oats were slightly to moderately infected in Kings county, N.S., and slightly to severely rusted throughout P.E.I.

SMUT (Loose Smut, Ustilago Avenae, and Covered Smut, U. Kollerii). An occasional head of loose smut was found near Summerland, B.C.

A field with a 3% infection of covered smut was reported from zone 10, Alta.

Covered smut was found in 16 fields out of 48 inspected in Sask., the average damage being slight; in 2 fields 20% of the heads were destroyed. Loose smut was observed in 5, while the average damage was a trace.

Covered smut was reported from 12 fields in Man., infection varying from a trace to 5%. On the other hand, a trace of loose smut was recorded from one field.

Both covered and loose smut were abundant and present in practically every field in Bonaventure county, Que.; the highest percentages recorded were: covered smut, 9%; loose smut, 8%. A trace to slight infections of loose smut were noted at Ste. Anne de la Pocatiere and Lennoxville.

Both smuts occurred throughout N.B.; for covered smut, infection varied from a trace to 20%, the average being about 5%, while, for loose smut, infection was less, a trace to 15%, with an average of about 3%.

Loose smut was reported from several counties of N.S., infection ranging from a trace to 15%; covered smut was less common, percentages of a trace to 7% being recorded. Mixed infections of the two smuts were not uncommon. Some smut was present in the variety plots at Kentville and Nappan.

Loose smut was present on oats throughout P.E.I., infection ranging from a trace to 65%. Covered smut was also observed; in one field of hullless oats in Queens county, 95% of the heads were affected. This figure was by actual count. (R.R. Hurst)

HALO BLIGHT (Phytophthora coronafaciens) caused a trace to light infection in several varieties at Lacombe, Alta. It was observed in 7 out of 14 fields examined in Man.; the average damage was slight.

FOOT ROT (Fusarium culmorum) was more common than it usually is in Alta., possibly on account of the dry warm season. Affected plants were bleached their entire length. Take All (Ophiocloa graminis), however, was much less prevalent than usual. Foot Rot and Leaf Spot due to Colletotrichum graminicola caused 3% damage in one field in zone 10.

Common Foot Rot (Helminthosporium and Fusarium spp.) was recorded in 52 fields out of 50 examined in Sask., and caused slight damage in zones 1 to 3. Pre-Maturity Blight (cause unknown) affected 5 fields out of 20 examined, the average damage was a trace. It injured about 5% of the plants in some hybrid lines in the Field Husbandry plots at Saskatoon.

No Foot Rot was found in the 4 fields examined in Manitoba.

LEAF BLOTCH (Helminthosporium Avenae) moderately to lightly infected most of the varieties at Lacombe, Alta.; traces were present on Anthony and Banner.

Oats were reported to be moderately infected at Ste. Anne de la Pocatiere, Que. Most varieties were slightly affected at Fredericton, N.B., Nappan and Kentville, N.S., while the infection was somewhat heavier at Charlottetown, P.E.I. Spores of the organism were found on the Charlottetown material. Slight infections were noted in the field in N.B., N.S., P.E.I., and Bonaventure county, Que. (I.L. Connors)

Undetermined Leaf Spots were found in 7 fields out of 48 in Sask.; the average damage was a trace.

SPECKLED LEAF SPOT (Septoria Avenae) was severe at Ste. Anne de la Pocatiere, but it caused no apparent damage. (C. Perrault)

NEMATODE (Heterodera schachtii). The discovery of this nematode was reported in some detail in 1934 (see P.D.S. 14:12-13), but no reference was made to it in 1935. Recently Dr. D. F. Putnam and Mr. E. I. McLoughry, Agricultural Representative of Waterloo county, have supplied important details of the present situation.

Several exploratory trips were made through the infested areas in Prince and Ontario counties during 1935 and 1936. It would seem that in 1934 when we worked on the problem, the infestation was at its lowest ebb and has since been increasing in intensity. A number of farms on which a mild infes-

tation was noted in 1934 are now fairly severely infested, and in addition several farms have been added to the list of those infested. In Ontario county about 8 farms are known to be infested as against 2 seen in 1934.. The dry weather this year further decreased the chances of obtaining a crop and a number of fields were ploughed up. Some farmers, however, are apparently having a measure of success in avoiding severe infestation by introducing more alfalfa into their rotation.

The discovery of another centre of infestation in Waterloo county by workers from the Ontario Agricultural College, emphasizes the seriousness of the problem as there are possibly other centres still undiscovered. Diseased material was sent to me by Prof. Howitt. (D. F. Putnam)

Regarding the infestation in Waterloo county, 24 farmers were visited last spring in areas where we considered fields might be infested. We took a sample of soil as well as plants from these fields. The samples were analysed and the plants examined for disease. In all cases nematodes were present. It should be noted that the disease is spread over a larger area than the number of visits we made would indicate. In the area where the infestation is most evident I am of the opinion that practically every farm has some of the disease present. Scattered fields throughout the county will probably show a certain amount of the disease. The following rotation has been recommended in the infested area. First year: hay mixture, alfalfa (2 years); Third year: corn for silage, or for husking, roots, soy beans, alfalfa; Fourth year: oats, barley, mixed grain; Fifth year: wheat, rye. Buckwheat has been suggested as an alternative crop in the third and fourth years. (E. I. McLoughry)

BLAST (Non-parasitic) affected 75% of the spikelets and reduced the yield 25% in one field in zone 10, Alta. It was present in all of the 48 fields examined in Sask.; the average damage was moderate. The trouble was severe at the Mel-fort Station. Blast affected a trace to 38% of the spikelets in the 7 fields examined in Man.; the average damage was slight. It was severe on Banner at the Brandon Farm.

Traces to slight amounts of blast were observed in the plots at Fredericton, N.B. Slight to moderate amounts were observed in 2 fields in the province. Traces were present in all oat fields in Kings county, P.E.I.

FROST BANDING was recorded on oats once from each of zones 9, 11, and 13.

BARLEY

STEM RUST (*Puccinia graminis*) was present in 10 fields out of 19 examined in Sask., and caused slight damage in zone 2 and a trace in zone 3. It was general in Man.; infection ranged from a trace to 50%.

Stem rust infection was general and severe at the Cap Rouge Station, Que. Traces were noticed in the plots at Ste. Anne de la Pocatiere and at Kentville, N.S. Infections ranging from a trace to 10% were reported on Charlottetown 90 in Kings county, P.E.I.

LEAF RUST (*Puccinia anomala*) very severely infected barley at Cap Rouge (C. Perrault). It was prevalent at Fredericton, N.B. Some rust was present on practically every variety, the highest infection being 35% on Olli. Infection was slight at Kentville and Nappan, N.S., and traces were recorded at Charlottetown, P.E.I., and Ste. Anne de la Pocatiere, Que. Traces in the field were noted in N.B. (I.L. Connors)

COVERED SMUT (*Ustilago Hordei*). A 2% infection was noted at Suna, B.C. and in a field in zone 10, Alta. It occurred in 3 fields out of 18 examined in Sask., with the average damage a trace. It affected 1% of the heads in a field at Lorden, Man. A trace was recorded at Ste. Anne de la Pocatiere, Que., and 6% in a field in Bellechasse county. Covered smut occurs throughout N.B., infection varying from a trace to 10%. Infections of a trace to 5% were reported from Kings county, P.E.I.

LOOSE SMUT (*Ustilago nuda*) was recorded from one field in Alta.; a trace in one field out of 18 in Sask.; a trace at Lorden, Man.; slight in Kamouraska and Quebec counties, Que., and traces at the Ste. Anne de la Pocatiere and Cap Rouge Stations, where the seed was treated by the hot water method before sowing. Loose smut occurs in all the counties of N.B., infection varying from a trace to 3%. A 10% infection was noted in one field, but a second was clean in Kings county, N.S. Infections of a trace to 10% were reported in Kings county, P.E.I.

STRIPE (*Helminthosporium gramineum*) caused a trace of infection in a field in zone 10, Alta.

Traces of stripe were noted in only two varieties at Kentville and Nappan, N.S., and none was found elsewhere. Previous reports of its abundance in Eastern Canada should be discounted, as the disease has been confused by some of the

workers there with the relatively common Net Blotch.

(I.L. Connors)

FALSE STRIPE (Cause unknown) affected 1% of plants in a field at Elie, 4 and 5% at Ginli, and 5% at Petersfield, Man.

NET BLOTCH (Helminthosporium teres) lightly infected Hannchen at the Lacombe Station, Alta.; a trace occurred on most other varieties. It severely infected one field at Watson, Sask. Undetermined leaf spots were found in 2 other fields out of 21 examined. It was present in 8 fields out of 12 examined in Man.; the average damage was slight.

Net blotch was prevalent at Fredericton, N.B., Kentville and Mappan, N.S., and Charlottetown, P.E.I. Victory was moderately to severely affected. Traces to slight infections were observed in the field in these provinces. Traces were found at Ste. Anne de la Pocatiere, Que., and in Bonaventure county. (I.L. Connors)

SPOT BLOTCH (Helminthosporium sativum) lightly infected Charlottetown 80 and traces were seen on other varieties at Lacombe, Alta. A slight general infection occurred throughout Man. It slightly affected Olli at Charlottetown, P.E.I. and traces to slight infections were recorded at Ste. Anne de la Pocatiere, Que.

FOOT ROTS. Common Foot Rot (Helminthosporium and Fusarium spp.) was found in 19 fields out of 21 examined in Sask.; the average damage was moderate in zone 2 and slight in zone 3. A slight infection was found at Ste. Rose du Lac and Laurier, Man., and a moderate infection at Gilbert Plains.

ERGOT (Claviceps purpurea) was reported on barley from Salmon Arm, B.C. Reports from Grain Companies indicate that ergot was noticeably more prevalent on barley in 1936 than in previous years in Man. Field observations indicated that infection was largely due to spread of the disease from heavily infected awnless brome grass growing beside the fields. Traces of ergot were observed in barley in Kings county, P.E.I.

SCALD (Rhynchosporium Secalis). Traces were found in a few varieties at Lacombe, Alta.

POWDERY MILDEW (Erysiphe graminis). A trace was present on barley plants in the Cereal greenhouse, Ottawa, Ont. A general and severe infection occurred in the plots at Cap Rouge, Que.

BACTERIAL BLIGHT (Phytomonas translucens) slightly infected Sans Barb at Ste. Anne de la Pocatiere, Que.
(I.L. Connors)

HEAD BLIGHT (Fusarium sp.). Traces were reported on several varieties at Ste. Anne de la Pocatiere, Que.

SPECKLED LEAF BLOTCH (Septoria Fuscinii) moderately infected Oxford (4023) and Fowlac (4023) at Kapuskasing, Ont., in Aug. 1935. It was also collected on barley in the neighboring settlement at Moonbeam (4022). (G. A. Scott and I. L. Connors)

FROST BANDING was recorded in a field of barley in zone 10, Alta.

RYE

STEM RUST (Puccinia graminis) lightly infected plants at the end of the rows at Lennoxville, Que. on July 16.

LEAF RUST (Puccinia secalina). Considerable infection was found in one field at Kentville, N.S. (3979). A slight amount was reported on rye on Wood Islands, P.E.I.

HEGOT (Claviceps purpurea) was recorded as follows; trace in the Field Husbandry plots at Saskatoon, Sask.; moderate infection at Winnipeg; collected at Kapuskasing, Ont. (4026) in 1935; 7% of the heads infected in a field on Ile aux Grues, Montmagny county, Que.; slight infection on Wood Islands, P.E.I.

COMMON FOOT ROT (Helminthosporium and Fusarium spp.) was found in one field out of 7 examined in Sask.; the damage was slight. A moderate infection was recorded in 2 fields at Ethelbert and Ashville, Man. respectively.

BACTERIAL BLIGHT (Pseudomonas (Phytomonas) translucens var. griffithii) caused a trace of infection on fall rye at Elm Creek, Man.

II. DISEASES OF FORAGE AND FIBRE CROPS

ALFALFA

COMMON LEAF SPOT (*Pseudopeziza Medicaginis*) was general on Vancouver Island and in the Fraser valley, B.C.; the damage was slight. It was general on all varieties at Agassiz and common on the older leaves at Summerland. It was present in one field in zone 10, Alta.; it slightly affected the crop at the Swift Current Station, Sask., and a trace occurred at Morden, Man.

Common leaf spot was general and severe on the lower leaves at Cap Rouge and Ste. Anne de la Pocatiere, Que.; a trace was recorded at Farnham. Moderately infected plants were received from Yarmouth county, N.S. at the Kentville Laboratory on June 22. A rather severe infection was observed at Charlottetown, P.E.I.

DOWNY MILDEW (*Peronospora aestivalis*) moderately infected Lytton and Ontario Variegated at the Agassiz Farm, B.C.; the damage was 5%. Baltic and Ladak were slightly infected while none appeared on Cossack, Grimm 178, and Grimm Reg'd. It caused moderate injury to alfalfa in large concrete tanks where trees are growing and the watering is done by sprinkler. Little downy mildew was present at the Windermere Station, probably on account of the dry, hot summer. A 45% infection was recorded in one field in zone 11, Alta.

YELLOWING (non-parasitic) occurred in spots and in whole fields in the Okanagan and Kootenay valleys, B.C.

ROOT ROT. A survey made on May 18 of the varieties grown at the Lacombe Station, Alta., revealed that Root Rot (*Sclerotinia* sp., etc.) and Winterkilling were slight on Ontario Variegated, and Lytton; trace on Hardiston Grimm (Lyman); and none on Grimm Brooks, Grimm Sask. 666, Grimm Sask. 471, and Cossack (M.W. Cormack). It moderately affected alfalfa at the Swift Current Station, Sask.

BACTERIAL WILT (*Phytoplasma insidiosum* (McCull.) Bergey et al.). Plants apparently affected with bacterial wilt were noticed at the Experimental Station, Windermere, but the identity of the disease has not been checked by cultures (H.R. McLarty). This is the first report of this important disease in Canada.

GREY MOULD (*Botrytis* sp. of *cinerea* type) was moderate to severe at the Experimental Station, Charlottetown, P.E.I. The blossoms of the main shoots were attacked, while the lateral branches

remained healthy. The blossoms were withered and yellowish and the shoot was affected for a distance of 2 inches. Lespedeza (4480) was similarly attacked. (R. E. Hurst)

COMMON CLOVER

COMMON LEAF SPOT (Pseudopeziza Trifolii) caused slight damage in Queens county, P.E.I.

POWDERY MILDEW (Erysiphe Polygoni) was reported on red clover from zone 10, Alta.; The Pas, Man.; Oakville, Ont.; at several places in Que.; and P.E.I. The infection was usually slight, but it was heavy at Farnham, Que., and in P.E.I. It was also heavy on alsike clover at Farnham, Que.

RUST (Uromyces Trifolii). The aecial stage was general on white clover at Winnipeg, Man. and a slight infection was noticed on alsike clover at The Pas.

Rust was heavy on a few red clover plants at Lennoxville, Farnham, and in a field in Waterloo county, Que., with traces on most of the other plants. It was also fairly abundant on alsike clover at the last two mentioned locations and at Ste. Anne de la Pocatiere. It was heavy on red clover in Queens county, P.E.I.

SOOTY BLOTCH (Gymadothea Trifolii) was abundant on the lower leaves of white clover in the Fraser valley, B.C. A slight infection was recorded on alsike clover at The Pas, Man.

It was fairly abundant on alsike clover at Farnham, Que., and it moderately infected red clover at Farnham and Lennoxville. Traces were recorded on red clover in Queens county, P.E.I.

ANTHRACNOSE (Kabatiella caulivora) almost completely destroyed a small plot of red clover in the test area at Charlottetown, P.E.I.

ROOT ROT. A survey of the varieties growing at Lacombe, Alta. May 18 showed Root Rot (Sclerotinia sp., etc.) and Winterkilling were slight on Mammoth White, Stryne White Dutch, and Common White Dutch; a trace on Morso White Dutch; and none on Alta Swede Red and Alsike (M.W. Cormack).

MOSAIC (virus) A trace of mosaic was found on red clover at Brandon, Man. Affected plants were observed on white clover in a farmer's field at Kingsclear, N.B.

SWEET CLOVER

MOSAIC (virus) was general on white sweet clover in the Salmon Arm district, B.C.

LEAF SPOT and STEM CANKER (Stagonospora Meliloti). A slight infection of the leaf spot was reported from Saskatoon and Indian Head, Sask.; and a trace from Brandon and Morden, Man.

ROOT ROT. As a result of a survey at the Lacombe Station, Alta., on May 18, Root Rot (Sclerotinia sp., etc.) and Winterkilling were found to be moderate to heavy on Zouave; moderate on Alpha 1, Alpha 2, and Redfield Yellow; slight on Common White, Grundy County, I.H.C. Yellow, and Brandon Dwarf; and a trace on Arctic (M.W. Cormack). A moderate infection was reported at the Swift Current Station, Sask. It also affected a few plants in the Experimental plot at Sidney, B.C.

BUCKWHEAT

YELLOW (Virus) was common and caused severe injury to buckwheat in York, Carleton, Charlotte, and Sunbury counties, N.B. In the varieties grown at Fredericton, the percentage of infected plants varied from 0.25% to 4.0%.

CORN

SMUT (Ustilago Zeae). Traces of smut were observed at Synyard and Duff, Sask. Infections recorded in Man. were: Brandon, trace; Winnipeg, 85% of the plants; Morden, slight. A slight infection of pop corn also occurred at Morden.

FLAX

RUST (Melampsora Lini) slightly infected flax in a field in zone 10, Alta. It was found in 3 out of 4 fields examined in Sask.; the damage was a trace to slight. A trace of rust occurred at Winnipeg, Man. It also lightly infected flax at the Kapuskasing Station, Ont. (4027), in 1935.

WILT (Fusarium Lini). A trace was present in Pusa, Brown, and ND114 on June 22 at Swift Current, Sask.

BROWNING (Polyspora Lini) moderately infected a field in zone 10, Alta.

BROOM-CORN MILLET

BACTERIAL STRIPE (Phytomonas Panici Ch. Elliott) was

observed on Ottawa 244 at the Experimental Station, Kapuskasing, Ont. (4032). The lesions were somewhat broader than recorded by Miss Elliott, but they were filled with bacteria (G.A. Scott & I.L. Connors).

SMUT (Sporogonium Paniculae). A trace was found at the Fredericton Station, N.B. (J.M.F. MacKenzie & S. Clarkson). One or two affected plants were found at Charlottetown, P.E.I.

MANGEL

CERCOSPORA LEAF SPOT (*C. beticola*). A trace was present at Lennoxville, Que., and it was general, but not severe at Ste. Anne de la Pocatiere.

CROWN GALL (*Phytomyza ituncifaciens*). A trace was present in Queens County, P.E.I. This disease was reported in N.B. in 1923 (P.D.S. 4:79, 1924).

DRY HEART ROT (Non-parasitic) affected 25% of the crop in a field at Grand Forks, B.C.

STRANGLE (Cause unknown). What appeared to be the same disease as described by W. Jones (P.D.S. 15:18) was noted in P.E.I. All the plants in the plot were very severely affected and finally died. (R.R. Hurst)

BACTERIAL ROT (*Erwinia aroideae*) was found following insect injuries in plants from the Experimental Station, L'Assomption, Que.

MOSAIC (virus). Two affected plants were seen in the variety test at Fredericton, N.B.

SUGAR BEET

BLACK LEG (*Phoma Betae*) was slight as a leaf spot on all varieties at Sidney, B.C. In October, about 8% of the roots were showing black leg. *Phomopsis tyronidia* has also been seen on some diseased roots. The lower leaves of all 12 varieties were slightly affected at the Agassiz Farm. In one variety it caused severe rot and in a second, considerable wilting and yellowing of the foliage.

CERCOSPORA LEAF SPOT (*C. beticola*) was moderate on Eagle Hill 472, Home Grown A, Swedish Improved, Stokes A1, Eagle Hill 360, U.S. No. 1 Curly Top, and Kühn; slight on G. W. Cercospora Resistant and R. & G.L. type; and a trace of Udeyz,

R. & G. N type, and R. & G. normal, at Sidney, B.C. None was seen at Agassiz. A trace was present on several varieties, but it moderately infected R. & G. Z type at Farnham, Que.

RUST (Uromyces Betae) was general on all the varieties grown at Sidney, B.C., but it had little effect on root yields. Kuhn was somewhat less infected than the others. The disease appeared on the root crop about a month later than in 1935. No rust was seen at Agassiz in August.

SORGHUM

COVERED KERNEL SMUT (Sphacelotheca Sorghi) affected about 10% of the plot at the Sidney Station, B.C.

BACTERIAL LEAF SPOT (Bacillus Sorghi) caused a slight infection at Brandon, Man.

SUDAN GRASS

LEAF SPOT (Bacillus Sorghi) was found at Kapuskasing, Ont., (4030) in 1935.

SUNFLOWER

WILT (Sclerotinia sclerotiorum) caused slight damage in a field in zone 10, Alta., a trace was present at Brandon, Man. It affected a few scattered plants at Ste. Anne de la Pocatiere, Que. A 3% infection occurred in a 2 acre field in Kamouraska county; the damage was slight.

DOWNY MILDEW (Plasmopara Halstedii) infections were first seen on July 8, but the conidia were not found until July 11 at Ste. Anne de la Pocatiere, Que. Primary infections occurred on 3.5 to 23.6% of the plants in the three fields. The disease is first noticeable sometime after the seedlings emerge, the diseased plants being stunted. The total yield is not reduced for the healthy plants grow excessively, and in consequence they are more woody and coarse and do not have the same value for ensilage as a uniform crop of smaller plants. Secondary spread was apparently unimportant on account of the dry season (C. Perrault).

RUST (Puccinia Helianthi) was severe at Winnipeg, Man.; moderate at Morden; and a trace was present at Brandon. It was collected at the Kapuskasing Station, Ont., (4033) in 1935. It was slightly affecting sunflowers at the Experimental Farm, Ottawa, Ontario on July 29. A moderate infection was found at Lennoxville, Que.

LEAF SPOT (Septoria Helianthi) was observed at the Experimental Station, Kapuskasing, Ont., (4025) in 1935.

SOY BEAN

NASTURIAL BLIGHT (Phytophthora blight) was severe at Ottawa, Ont. A moderate infection occurred on Manitoba Brown and a trace on Wisconsin Black at Lemaxville, Que. A trace was seen at L'Assomption.

CULTIVATED GRASSES

AWNLESS BROME GRASS (Bromus inermis)

Leaf Spot (Septoria bromi) was fairly common along roadsides in southern Sask.; it was less prevalent in northern Sask. A slight, but general infection occurred on volunteer plants at Winnipeg, Man.

Leaf Blotch (Helminthosporium Bromi) slightly but generally affected this grass at Winnipeg, Man.

Ergot (Claviceps purpurea) moderately infected volunteer awnless brome grass at Winnipeg, Man.

CRESTED WHEAT GRASS (Agropyron cristatum)

Ergot (Claviceps purpurea) was moderate at Winnipeg, Man.

CREeping BENT GRASS (Agrostis palustris)

Scattered dead spots appeared in a bowling green at Saskatoon, Sask., on May 14. The spots were perfectly circular and measured 2 to 12 inches in diameter. They closely resembled Dollar Spot (Blizzetonia sp.) in appearance.

ORCHARD GRASS (Dactylis glomerata)

Brown Stripe (Ecoleotrichum graminis) was general on the 10 strains under test at Agassiz, B.C.; it least affected 962 and N.E. 766. It was also general on Vancouver Island and in the Fraser valley.

Purple Leaf Spot (Mastigosporium album var. muticum) was general on the 10 strains being grown at Agassiz, B.C. It was least destructive to 615.

Ergot (Claviceps purpurea) moderately infected orchard grass at Winnipeg, Man.

PERENNIAL RYE GRASS (Lolium perenne)

Rye Spot (Ocularia lolii) was of general occurrence on Vancouver Island and the Lower Mainland, B.C.; it caused considerable damage to the lower leaves especially during the spring. No differences in infection were noted on the 7 varieties in the plots at Sidney.

TIMOTHY (Phleum pratense)

Stem Rust (Puccinia graminis var. Phlei-pratensis) was reported as follows: a trace on Commercial 361, but absent on other strains at Agassiz, B.C.; trace at Winnipeg, Man.; trace at the Experimental Station, Fredericton, and in Carleton county, N.B.; severe on a single clump at the Station, Kentville, N.S.

Smut (Ustilago striiformis) was general on plants along the roadside at Sumas Prairie, B.C., (3837) on May 28; also a few plants were affected in one strain at Agassiz. Affected plants were killed back to the base (W. Jones). One rather heavily infected clump was reported at Winnipeg, Man.

Leaf Spot (Heterosporium Phlei) A slight amount was present on timothy at the Station, Fredericton, N.B. (I. L. Connors).

WESTERN RYE GRASS (Agropyron tenerum)

Stem Rust (Puccinia graminis) slightly affected the grass at Regina, Sask.

Smut (Ustilago bromivora) affected 15% of the plants in a field on the University Farm, Saskatoon, Sask. It slightly to moderately affected the crop at the Station, Swift Current.

VELVET GRASS (Holcus lanatus)

Twist (Dilophospora Alopecuri (Fr.) Fr.) is a fairly generally distributed disease on Vancouver Island (4219) and the Fraser Valley (W. Jones). This is a record of unusual interest as the organism has been recorded from Canada only once before when it was collected on barley at Carlyle, Sask., (2129) by Dr. P.M. Simmonds. Although Sprague has recorded it from Oregon on the same host (U.S. Pl. Dis. Reporter 19: 173. 1935). No nematodes were found associated with the disease by Mr. Jones which is contrary to the finding of Atanasoff (Phytopath. 15: 11. 1925).

III. DISEASES OF VEGETABLE AND FIELD CROPS

ASPARAGUS

RUST (*Puccinia Asparagi*) caused slight damage at Saskatoon, Sask.; it was severe on an unknown variety causing premature discoloration and defoliation at Indian Head, while it was slight to moderate on Martha Washington and Mary Washington.

BEAN

MOSAIC (virus). 25% of the Wax Bean plants were affected in one patch, while all were healthy in another at the Summerland Station, B.C.; 75% were infected in a plot in zone 10, Alta.; Princess of Artois was moderately affected at Brandon, Man.; a trace was present in a small garden at L'Assomption, Que.

ANTHRACNOSE (*Colletotrichum Lindemuthianum*) caused 25% damage to Interloper Challenge Black Wax at the Experimental Farm, Agassiz, B.C.; Stringless Green Pod and Round Pod Kidney Wax were also affected, while Pale No. 1 was clean. Anthracnose was found in a garden at the Experimental Station, Summerland, on plants of Stringless Green Pod grown from seed received from Ottawa. This is the first record of its occurrence in the Okanagan valley. (G.E. Woolliams).

Anthracnose affected 18% of the plants in an acre field of White Pea beans in Portneuf county, Que. and caused a loss of about 10% of the crop. It occurs generally throughout N.B., causing slight to severe damage. The disease was found in a few fields in the vicinity of Kentville, N.S.; the damage was slight to severe.

BACTERIAL BLIGHT (*Phytomonas Phaseoli*) affected all of the plants of Red Kidney bean in a garden in zone 9, Alta. The disease was heavy on Davis White Wax, Wardells White Wax and Interloper Challenge Black Wax at Lacombe, Alta.; other varieties were moderately to lightly infected except Dwarf Golden Poddied Wax, which showed only a trace. It slightly affected the crop at the Station, Swift Current, Sask.

Bacterial blight caused a loss of 25% of the crop in a field near Strathroy, Ont. according to H.F. Hudson, Entomological Branch. Diseased specimens were brought to the Laboratory from Billings' Bridge, near Ottawa. Blight infection was slight in a garden at Farnham, and slight to moderate at Ste Anne de la Pocatiere, Que. It caused severe damage in some commercial plantings in Westmoreland county,

N.B. Slight amounts were also present in York, Sunbury, and Queens counties. It caused moderate damage to beans at Charlottetown, P.E.I.

RUST (Uromyces appendiculatus) caused a trace to 10% infection on pole beans in York county, N.B.

SCLEROTIAL ROT (Sclerotinia sclerotiorum) affected at least 5% of the plants in a quarter-acre field of White Pea beans in Champlain county, Que. Some plants were dead and entirely covered with sclerotia (B. Baribeau). A few plants were injured at Kentville, N.S.

DRY ROOT ROT (?Fusarium Solani var. Martii f.3.) destroyed about 5% of the plants in a garden at Kentville, N.S.

BEET

SCAB (Actinomyces scabies) caused a 20% infection on beets in a field in Champlain county, Que. The beets were grown on sandy soil to which lime had been applied in 1929 at the rate of 1,500 lb. per acre, and on which a potato crop affected by scab was produced in 1935 (B. Baribeau). About 30% and 80% of the beets respectively, were severely infected in 2 gardens at Ste. Anne de la Pocatiere, Que. Scab infected 7.5% of the beets in a local garden at Charlottetown, P.E.I. and traces were reported in several localities in Queens and Kings counties.

CERCOSPORA LEAF SPOT (Cercospora beticola) was of general occurrence about Sidney, B.C. and in the Fraser valley. It was commonly found in gardens in Lincoln county, Ont., but the damage was negligible. A trace was found at Farnham, Que.; a trace to moderate infections occurred on beets being grown on muck soils at Ste. Clothilde de Chateauguay; it was most prevalent in a plot, where no potash was added. A trace to slight infections were noted in gardens in York county, N.B.

RUST (Uromyces Betae) heavily infected the leaves at Sidney, B.C., but it appeared too late to affect the yield materially.

DAMPING OFF (Fusarium and Rhizoctonia spp.) was prevalent throughout N.B. on beet seedlings and occasionally caused severe losses. (J.L. Howatt)

ROOT CANCKER (cause unknown). A hard dry rot of roots often accompanied by cracking or cankers, which are generally found slightly below soil level, was reduced from

18% to 5% by the application of borax at 18 lb. per acre, in an experimental plot at Sidney, B.C. (W. Jones)

CABBAGE

SOFT ROT (Erwinia carotovora) destroyed 1% of the heads at Agassiz, B.C.

CLUB ROOT (Plasmodiophora Brassicae) injured a few plants at the Experimental Station, Kentville, N.S. It infected a few Copenhagen Market in a garden in Queens county, P.E.I.; it was reported to occur in many gardens throughout the province.

SCLEROTIAL ROT (Sclerotinia sclerotiorum). Out of 60 cabbages at harvest time, 6 were affected and 2 were unfit for use in a garden at Ste. Anne de la Pocatiere, Que. The soil was heavy and damp. (B. Baribeau)

OEDEMA (Non-parasitic) slightly affected seedling cabbage plants being grown in a greenhouse at Cap Rouge, Que.

WIRE STEM (Rhizoctonia Solani). Some thousands of seedlings or about 60% of the sowing were lost because fresh manure was incorporated in the propagating flats by a grower in York county, N.B.

AMMONIA BURN. A small area in one frame of cabbage seedlings were injured by the ammonia gas arising from manure in the frame in Lincoln county, Ont. The plants recovered upon the development of new leaves.

CARROT

YELLOW (virus) is becoming increasingly common on carrot in York and Sunbury counties, N.B.; a trace to 50% of the plants were affected this year.

LEAF BLIGHT (Macrosporium Carotae) moderately to heavily infected carrots at Agassiz and Mission, B.C. The damage was a trace to slight. (W. Jones)

SCLEROTIAL ROT (Sclerotinia sclerotiorum). Several growers lost from 5 to 50% of their carrots in storage during the winter of 1935-36 at Kentville, N.S.

CAULIFLOWER

SOFT ROT (Erwinia carotovora) destroyed 1% of the plants at Agassiz, B.C.

BLACK ROT (Phytophthora campestri) caused a 3% loss in a market garden of about an acre in Sunbury county, N.B.

CLUB ROOT (Plasmiodiophora Brassicae) affected 2 plants of Early Snowball in a garden in Queens county, P.E.I.

CELERY

LATE BLIGHT (Septoria Apii) was general in Saanich county and about Victoria, B.C.; the damage was slight. Late blight (Septoria Apii-graveolentis) did not appear until late in the summer in Lincoln county, Ont., and caused much less damage than it usually does. (J.K. Richardson)

It slightly to moderately affected celery in Queens county, P.E.I.

EARLY BLIGHT (Cercospora Apii) slightly infected celery at Morden, Man.

DAMPING OFF (Rhizoctonia Solani) affected 50% of the transplanted seedlings in a planting of Paris Golden in Lincoln county, Ont. Plants appeared to be recovering by forming new roots. The weather was cool and moist during most of April, which may have favoured disease development. (G.C. Chamberlain)

BLACK HEART (Non-parasitic). Although the disease was observed in some of the earlier plantings in Lincoln county, it was not of economic importance in 1936 in Ont. (J. K. Richardson).

CUCUMBER

BACTERIAL WILT (Erwinia tracheiphila) moderately affected cucumbers in 2 small garden patches, one at Farnham and another at L'Assomption, Que.

WILT (Fusarium sp.). After a lapse of several years there was a recurrence of this destructive disease in 1936 in Queens county, P.E.I. Entire plantings were destroyed at the Experimental Farm, Charlottetown, and neighbouring gardens shortly after the first crop was removed. A Root Rot (Fusarium sp.) caused slight damage in a field in zone 10, Alta.

SCAB (Cladosporium cucumerinum) was general in York and Sunbury counties, N.B.; it affected 5 to 50% of the fruit. It injured about 15% of the fruit in a garden in Queens county, P.E.I.

SCLEROTIAL ROT (Sclerotinia sclerotiorum) affected 3 to 5% of plants, which eventually were killed, in a greenhouse at Summerland, B.C.

FRUIT ROT (Botrytis sp.). A few fruits were rotted by the fungus in greenhouse plants in the Summerland district, B.C.

BUD and FRUIT ROT (Fusarium sp.). A few buds and young fruits were destroyed and the Fusarium was found fruiting upon them at Falmouth, N.S.

ANGULAR LEAF SPOT (Phytophthora lachrymans) caused moderate spotting of the leaves and fruits in a seven acre field of cucumbers in zone 10, Alta.

LEAF SPOT (Alternaria sp.) moderately infected cucumbers in a planting at Charlottetown, P.E.I. A leaf spot that may be identical with this one has previously been reported from Man. and Ont. on cucumber.

EGG PLANT

WILT (Verticillium Dahliae) affected 25 to 100% of plants in plantings of Black Beauty and New York Purple in Lincoln county, Ont.; it causes stunting and death of the plants.

HOPS

DOWNY MILDEW (Pseudoperonospora Humuli). The Clusters variety was seriously affected in hop yards in B.C., where no copper lime dust was applied. Rainy weather in the spring aided the early spread of the disease, but dry weather checked it during the summer, not however before considerable damage had been done. (W. Jones). Downy mildew was found in a few hop yards at Fournier, Ont., where hop growing was recently undertaken. Of the 150 acres in hops, 25 were set out in 1936. (G.H. Berkeley)

POWDERY MILDEW (Species undetermined) was found on a few leaves in one plantation at Fournier, Ont.

MOSAIC (virus). A few infected plants were seen in the hop yards at Fournier, Ont.

CHLOROSIS (virus). About 1 to 2% of the Golding variety were showing symptoms of chlorosis at Sardis and Agassiz, B.C. The damage was very slight.

LETTUCE

DROP (Sclerotinia sclerotiorum). About 1% of the plants were destroyed in $1\frac{1}{2}$ acres of Imperial D. lettuce at Surrey, B.C.; the disease occurred in patches, where probably 50% of the plants had dropped. A light infection was present in all varieties grown at Lacombe, Alta. It slightly infected lettuce at Ste. Anne de la Pocatiere, Que.

DOWNY MILDEW (Bremia Lactucae) was severe in a $1\frac{1}{2}$ acre field of Imperial D. at Surrey, B.C. and caused the loss of 50% of the crop. The mildew only destroys the outer leaves, but it makes the heads soft, small, and commercially unmarketable (J.W. Eastham). It also caused considerable damage to plants grown for seed at Shawnigan as the seed from the affected crop was light and difficult to thresh (W. Jones). Downy mildew was heavy on unharvested plants at Abord a Plouffe, Que. Diseased seedling Iceberg plants were received from Dartmouth, N.S. with the statement that the disease had been serious for the past 2 to 3 years.

TIP BURN (Non-parasitic) affected 50% of the plants at the Summerland Station, B.C.; it was moderate on lettuce at Ste. Anne de la Pocatiere, Que.

SLIME (Bacterial rot, following tip burn). In two plots of an acre each Imperial D. and #12 were sown on the same date at Surrey, B.C. After a period of hot weather and rain in early August, the loss was 95% in Imperial D. and 5% in #12. (J.W. Eastham)

YELLOW (virus) was common in gardens at Fredericton, N.B.

MELON

BACTERIAL WILT (Erwinia tracheiphila). A trace was found in a garden at Farnham, and in another at Lennoxville, Que.

LEAF SPOT (Macrosporium cucumerinum) was found on material received from Chateauguay, Que.

SCAB (Cladosporium cucumerinum) caused 5% damage at Maugerville, N.B.

SCLEROTIAL ROT (Sclerotinia sclerotiorum) affected 5% of the fruit in a patch containing about 300 melons at Maugerville, N.B.

ONION

DOWNY MILDEW (*Peronospora Schleideniana*) was severe on onions grown for seed at Elk Lake, B.C.; it caused 50% damage. The disease was general on Vancouver Island and on the lower mainland, and was more abundant than in 1935. However, the damage was slight, except where the onions were grown for seed. Diseased specimens were received from Oakville, Ont., at the Ottawa laboratory. It was heavy on a crop at Abbotsford, Que., but it caused no significant damage as it was checked by dry weather.

GREY MOULD (*Botrytis* sp.) was severe on the leaves sent from Cumberland, Ont.; to the Ottawa laboratory. The fungus apparently entered at places injured by thrips. (F.S. Thatcher)

NECK ROT (*Botrytis Allii*) affected 3% of Improved Ailsa Craig in Queens county, P.E.I.

YELLOWS (virus). A condition resembling yellows was found in several varieties of onions at the Experimental Station, Fredericton, N.B. Affected plants were chlorotic and unproductive.

PARSIP

YELLOWS (virus) affected 50% of the plants in a garden at Fredericton, N.B.; the damage was slight.

PEA

POD RY MILDEW (*Erysiphe Polygoni*) was reported to have been destructive for the past three years by a grower in zone 6, Alta. Infection was abundant on field peas at Farnham, and on Prince of Wales variety at Lennoxville, Que. It was general throughout N.B., but did little damage.

LEAF and POD SPOT (*Ascochyta Pisi*) was prevalent on Telephone and Lincoln peas at Salmon Arm, B.C. It slightly, but widely infected peas in a plot in zone 10, Alta. It was common at Indian Head, Sask., but was only slightly injurious. It was present on material from Oakville, Ont. A trace to slight infections occurred at Ste. Clothilde de Chateauguay, and at Ste. Anne de la Pocatiere, Que. The disease was severe in a few gardens at Kentville, N.S., but the damage elsewhere was slight. It slightly infected peas at Charlottetown, P.E.I.

LEAF BLOTCH (*Septoria Pisi*) was reported as follows: slight infection in one field in zone 10, Alta.; moderate infection in a garden at Kelliher, Sask., and at the Station,

Swift Current; heavy at the Station, Kapuskasing, Ont. (4031) in 1935; light in a garden in Quebec county, Que.; very heavy in a garden in Queens county, P.E.I.

CLADOSPORIUM SPOT (C. picicola Snyder). Diseased material collected at Salmon Arm and sent to Dr. Snyder, University of California, Berkeley, California, was found by him to be affected with two types of spotting. One was an Ascochyta spot and the other caused by Cladosporium picicola, which was described by him (see Phytopath. 24:890-905. 1934). In his opinion this is the first record for Canada. (R. E. Fitzpatrick).

RUST (Uromyces Fabae) was moderate on field peas and heavy on garden peas at Farnham, Que.; it was common but not heavy on vines and pods at Ste. Clothilde de Chateauguay and a trace was also found at Lennoxville. It was general on peas in York and Sunbury counties, N.B.; a slight infection was reported from Charlottetown, P.E.I.

ROOT ROT (Fusarium spp.) affected 25 to 50% of the plants depending on the variety at Cap Rouge, Que. Root Rot (Fusarium, Rhizoctonia and other fungi) is apparently present in most gardens and commercial plantings in N. B. Generally, only one picking of peas is possible on account of the death of the roots. (J. L. Howatt)

OEDEMA (Non-parasitic) was quite severe on some plants of field peas of imported varieties in the Cereal greenhouse, Ottawa, Ont., on March 18.

DOWNY MILDEW (Peronospora Pisi) is present on peas every year at the Station, Windermere, B.C.

PEPPER

MOTTLE LEAF (virus) affected 3 plants out of 12 at the Experimental Station, Summerland, B.C. (H.R. McLarty)

BLOSSOM-END ROT (Cause unknown). Fifteen to 20% of the ripening fruit were rotted at the blossom end at Indian Head, Sask. Alternaria sp. was found constantly fruiting on various sized spots or near the margins of rotted areas. Frequently, half the fruit was necrotic.

LEAF SPOT (Alternaria sp.) caused severe defoliation in a planting in Lincoln county, Ont.

POTATO

Mr. John Tucker, Chief Potato Inspector, has again provided tabulations on the extent of the seed potato industry, the reasons why fields failed to pass inspection and the average percentage of the three major diseases, black leg, leaf roll, and mosaic, as they occur by provinces. It must be noted that all fields entered for certification are planted with certified seed.

Table 2 - Seed Potato Certification: Number of Fields and Acres Inspected, 1936.

Province	Number of Fields		Fields Passed %	Number of Acres		Acres Passed %
	Entered	Passed		Entered	Passed	
P.E.I.	3,203	2,664	83.2	11,518	9,843	85.5
N.S.	536	460	85.3	1,875	1,778	83.9
N.B.	794	671	84.5	3,380	3,015	89.2
Que.	1,792	898	56.4	1,481	738	49.8
Ont.	756	613	81.7	1,584	1,276	80.6
Man.	107	96	91.4	327	316	96.6
Sask.	131	121	92.4	344	335	97.4
Alta.	201	182	90.5	220	203	92.3
D.C.	268	178	66.4	354	235	63.6
TOTAL	7,586	5,888	77.6	20,083	16,739	83.3

Table 3 - Seed Potato Certification: Acreages by Varieties, 1936

	Irish Cob- bler	Green Moun- tain	Bliss Tri- umph	Dooley	Katah- din	Early Ohio	Netted Gem	Other Vari- eties
Acreage Inspected:								
P.E.I.	7,743	3,585	176					14
N.S.	369	39	307		126			34
N.B.	342	1,852	1,112	7	26			41
Que.	185	1,261		5				30
Ont.	375	147		912	113			32
Man.	128	1	1			60		136
Sask.	70		2			180	55	37
Alta.	17		12		3	17	108	63
D.C.	11	37				5	208	93
Total								
Acreage:								
Passed	3,160	4,929	1,570	772	247	242	312	397
Rejected	980	1,993	40	152	21	15	60	83
Inspected	9,240	6,922	1,610	924	268	267	372	480

Table 4 - Seed Potato Certification: Fields Rejected, 1936.

Province	Mosaic	Leaf Roll	Black Leg	Foreign Varieties	Adjacent to Diseased Fields	Misc.	Total
P.E.I.	224	3	35	73	88	116	539
N.S.	29	3	5	7	20	12	76
N.B.	72	0	15	21	7	8	123
Que.	351	27	24	17	73	202	694
Ont.	8	7	17	28	9	69	138
Man.	0	0	0	4	0	5	9
Sask.	0	0	1	0	0	9	10
Alta.	0	4	12	0	3	0	19
B.C.	20	28	6	4	14	18	90
	704	72	115	154	214	439	1,698
Rejections as a percentage of fields:							
Entered	9.3	1.0	1.5	2.0	2.8	5.8	22.4%
Rejected	41.5	4.2	6.8	9.1	12.6	25.8	100.0%

Table 5 - Seed Potato Certification: Average Percentage of Disease Found in the Fields in 1936.

Average percentage of disease found in -	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
	%	%	%	%	%	%	%	%	%
Fields entered (first inspection)									
Black Leg	.15	.06	.20	.10	.13	.08	.03	.35	.14
Leaf Roll	.02	.17	.06	.35	.08	.06	.03	.58	.16
Mosaic	.69	.65	.70	1.35	.08	.02	.01	-	.74
Fields passed (final inspection)									
Black Leg	.06	.01	.07	.05	.06	.09	.02	.02	.06
Leaf Roll	.02	.09	.02	.18	.05	.05	.01	.02	.06
Mosaic	.10	.09	.19	.44	.05	.01	-	-	.15

There was practically no change in the total production of Certified Seed Potatoes in 1936. The number of fields entered for inspection rose from 7,549 fields in 1935 to 7,586 in 1936, while the acreage declined from 20,374 acres in 1935 to 20,083 in 1936. As the percentage that passed inspection was greater than in the previous year, the number of acres passing inspection was practically the same: 16,751 acres in 1935 and 16,739 in 1936. On the other hand, of the fields inspected, 1,698 or 22.4% failed to pass inspection on account of diseases or other causes, a figure slightly higher than that of 1935. The presence of mosaic in excess of the amount permitted continues to be the major cause of rejection, being 41.5% of the fields rejected.

LATE BLIGHT (*Phytophthora infestans*) was more prevalent than usual in B.C. It appeared very early in the season, some being found on July 7 in the Fraser River valley. It was general before the end of the growing season and affected about 80% of the plants on the lower mainland including Lulu Island, Langley, Chilliwack, and Agassiz. The loss from reduced yield and from tuber rot was estimated to be 20% in the affected localities. It was found in the Pemberton district on Aug. 4, where it was previously unknown. Late blight was also general in the Courtenay, Nanaimo and Ladysmith districts on Vancouver Island.

As the potato growers in B.C. have never considered late blight of sufficient importance to warrant the outlay in time and materials to spray against it, they were unprepared for a serious outbreak. However, a few growers on Lulu Island did spray their crops and it is anticipated that more will do so in the future. Spraying experiments conducted in 1935 and 1936 have shown that it is profitable to spray in certain localities against late blight. Loss of yield is especially noticeable in late planted crops. (H.S. MacLeod)

Late blight was present in fields throughout Que., and it attacked all varieties, but more particularly those with white tubers. The disease was most severe in the Three Rivers district. The average damage to the tubers was about 5%. (B. Baribeau).

Late blight appeared in the latter part of July in N.B. It was already prevalent in the early part of August, but it was checked by weather unfavourable for its development during late August and early September. However, later in September conditions again favoured its spread. As a result, it was severe in the southern and central potato-growing areas. Spraying, which was especially well done by

the seed growers, checked the disease. In unsprayed fields it was reported that as high as 75% of the tubers showed rot. No blight was reported in the North Shore area. A combination of late blight infection, frost injury, and bacterial decay was quite common and might have easily been mistaken for the bacterial wilt and rot present in Quebec (J.L. Howatt).

Late blight was severe in N.S., especially where the soil was heavy or the subsoil was of an impervious nature. One field was seen where digging had been abandoned on account of rot. Fields showing 10% of rot were not uncommon in Colchester, Cumberland, Pictou and Halifax counties and it was present in other counties including Antigonish and Inverness. Efficient spraying, however, gave good control. In Colchester county, well-sprayed crops even when adjacent to diseased crops gave healthy tubers. (W.K. McCulloch)

Late blight was more or less severe in all parts of P.E.I., being the worst year in the past six. Tuber infection ranged from 1 to 50%, the average loss being about 5% (S.G. Peppin). Blight was first observed on July 28 and by Aug. 15 the disease had reached epidemic proportions. Weather continued favourable for blight development and by the middle of September, many unsprayed potato fields were completely destroyed. (R.R. Hurst)

RHIZOCTONIA (Corticium Solani). Although Rhizoctonia was quite general in B.C. this year, it was not as severe as usual. Although planting was at least 10 days late, good growth was made by the crop in the early season. More attention is being paid to crop rotation and seed treatment. (H. S. MacLeod)

Rhizoctonia injured only a small percentage of plants in Alta. Sclerotial development on the tubers was not extensive, as the plants in most fields continued active growth until digging time (J. W. Marritt). Traces of Rhizoctonia were reported from Winnipeg and Morden, Man.

Rhizoctonia was fairly general in all potato districts of N.B.; infection varied from a trace to 100% of the tubers (J.L. Howatt). Only small amounts of Rhizoctonia were observed in the field in N.S., but tuber infection ranged from 5 to 100%. Bliss Triumph, dug early, was practically clean, but late-dug Irish Cobbler, Green Mountain, and Katahdin were severely infected. Many lots of tubers in Kings and Colchester counties could not be graded for seed on that account (W.K. McCulloch). Rhizoctonia was more than usually prevalent on the tubers in P.E.I. on account of late harvesting. (S.G. Peppin).

COMMON SCAB (*Actinomyces scabies*). The greater part of the potato stocks that passed field inspection in Alta. and northern Sask. cannot be certified on account of scab, except those of the Netted Gem variety. Some growers who have had little trouble in the past will find it difficult to grade their stock to meet certified seed standards (J. W. Marritt).

On land at St. Francois, Montmagny county, Que., finely ground limestone was applied in 1929, at the rate of one ton per acre. Since then, potatoes grown thereon have been scabby. This year mercuric chloride, borax or both combined were applied to the soil in plot trials, but no control was obtained. (B. Baribeau)

Scab was widespread in N.B., tuber infection ranging from a trace to 100%. The average percentage of tubers affected was less than in 1935 (J.L. Howatt). Common scab infection ranged from 1 to 20% in N.S., and was observed in all counties where crops were inspected. Many clean crops were observed, chiefly where the soil was in a good state of cultivation (W.K. McCulloch). Scab was found on all varieties in P.E.I. The loss in grading probably did not exceed 5%. (S.G. Peppin)

BLACK LEG (*Erwinia phytophthora*) was found in 54 out of 263 fields examined in B.C. and resulted in the rejection of 6 (H.S. MacLeod). It was less prevalent in Alta. and north-western Sask. than in 1935; few fields were infected, and the percentage of diseased plants was small. It caused some damage in isolated points in the B.C. Peace River area. (J.W. Marritt)

As a tuber rot the disease was more prevalent than usual in N.B. in this year's crop, but the average damage was slight (J.L. Howatt). Black leg was found in Kings, Colchester, Pictou, Cumberland, Antigonish, Halifax, and Inverness counties, N.S. It was present in 8% of the fields under observation. Infection was usually slight, except in 5 fields, where infection ranged from 3 to 5%. Practically all fields where the seed was treated were free from the disease (W. K. McCulloch). Thirty-five fields were rejected on account of black leg out of 3,203 inspected in P.E.I. It was more prevalent than usual at the time of the first inspection (July 26 to Aug. 15); infection ranged from a trace to 7%. (S. G. Peppin)

EARLY BLIGHT (*Alternaria Solani*) moderately infected the crop throughout B.C.; it caused some reduction in yields on Vancouver Island where it appeared early in the season (H. S. MacLeod). It was moderate on potatoes at the Station,

Farnham, Que. Early blight was widespread in N.S., but owing to the cool season it did not cut down the plants early; 3% of *Alternaria* rot was found in one lot of Irish Cobbler in Colchester county (W.K. McCulloch). Early blight was less prevalent in P.E.I. than in 1935 and it did not become general until Sept. 1. A severe outbreak was observed on a crop of Warbas at the Charlottetown Laboratory. Incidentally, it might be mentioned that flea beetles were also less prevalent than usual. (S.G. Peppin & E.H. Saunders)

SILVER SCURF (*Spondylocadium atrovirens*). Very few tubers of Irish Cobbler in N.S. can be said to be free of silver scurf, but 3% of the tubers were noticeably affected in a lot in Kings county this fall. A severe infection was present on Katahdin in the early spring (W.K. McCulloch). Very little silver scurf has been found up to Dec. 1 on Irish Cobbler in P.E.I. (S.G. Peppin)

POWDERY SCAB (*Spongospora subteranea*) was reported from all counties of N.B. The disease is most common and destructive in the North Shore area; infection ranges from a trace to 75% (J.L. Howatt). Powdery scab was rather common this year in N.S. Usually the infection is a trace to 0.5% of the tubers, but in one lot of Bliss Triumphs, 4% of the tubers were affected. The latter variety appears to be more susceptible than Irish Cobbler (W.K. McCulloch). The disease was found in only a few bins of Bliss Triumph in Kings county, P.E.I. (S.G. Peppin)

BACTERIAL WILT and ROT (Cause undetermined) was found in 29 counties in Que. in 1936. Infection ranged from 1 to 66% and the yield was reduced from 1 to 40% with an average reduction of 15% in the infected fields. Bacterial wilt was first observed in 1931 on the Green Mountain variety and two years later on Dooley. In 1934 it was found on Carmen No. 3, Early Rose, Carmen No. 1, Irish Cobbler, Spaulding Rose, Rural Blush and Dakota Red, and finally in 1936 on Katahdin, Chippewa and Warba. The Green Mountain, Dooley, Chippewa, Carmen No. 3, and Spaulding Rose varieties seem to be more susceptible to the disease than the others.

In table 6 information on the distribution of bacterial wilt of potato in Quebec has been summarized from the field inspection reports from 1931 to 1936 inclusive. The disease was most severe in 1934, but it was almost as prevalent in 1936.

Table 6 - Six year summary of field inspection reports on the distribution of bacterial wilt of potato in the Province of Quebec:-

	Year					
	1931	1932	1933	1934	1935	1936
Counties:						
Visited	49	44	49	51	52	44
Wilt present	18	8	22	34	20	29
Parishes:						
Visited	293	207	228	254	209	195
Wilt present	50	21	70	159	46	94
Fields:						
Visited	2,069	1,394	1,616	1,989	1,719	1,592
Rejected for wilt (1)	37	9	34	168	58	160
Accepted but wilt present (2)	152	52	254	359	77	184
<p>(1) These fields were rejected because they contained more than 1% of wilt upon field inspection.</p> <p>(2) These fields contained 1% or less of wilt and the crop from them was eligible for certification except in 1936, when it was decided to issue no certification tags to growers whose fields were showing even a trace of this wilt upon inspection, in order to eliminate the disease if possible.</p>						

From 1931 to 1936, 62 counties of Quebec, comprising 476 parishes, have been visited. The bacterial wilt disease has been found in 45 counties and in 224 parishes during the 6 years. Of the 224 parishes in which wilt has been found, 1% or less of bacterial wilt was found in 142 parishes, 10% or more in 72, and 25% or more in 10. During the 6 years an average of over 1,700 fields representing 2,000 acres have been visited annually. (Summarized from a report by B. Baribeau)

WILT (*Erwinium* spp.) was found in 26 out of 208 fields grown from certified seed in B.C. and 2 were rejected. Very little wilt was found in Alta. and North-western Sask., but in one field at Saskatoon practically 100% of the plants were affected. Out of 3,203 fields 12 were rejected for wilt in Queens and Prince counties, P.E.I.; the highest infection was 25%.

MOSAIC (virus) occurred in 155 fields out of 240 inspected and 20 were rejected for mosaic in B.C. Mosaic has a similar distribution to leaf roll in Alta., but it is not as prevalent. The disease was severe in N.S., especially on Green Mountain. Over 43% of the fields inspected were infected, the worst infections ranging from 3 to 22% were chiefly in Kings and Inverness counties. In one field of Green Mountain of commercial stock in Colchester county, 30% of plants were affected (W.K. McCulloch). Out of 3,203 fields 224 were rejected on account of mosaic in P.E.I. Some success has been obtained in controlling the disease by tuber-unit seed plots. (S. G. Peppin)

LEAF ROLL (virus). There was a marked increase in leaf roll in B.C. over 1935; it was found in 134 fields out of 268 inspected and 25 were rejected on account of leaf roll (H.S. MacLeod). As in 1935, potatoes grown on vacant lots and gardens in the city limits and in fields about Edmonton, Calgary, and Medicine Hat, Alta., contained leaf roll, and in many nearly 100% of the plants were affected. In other parts of Alta. and in north-western Sask. the disease was negligible. (J.W. Marritt)

Over 30% of the fields under observation in N. S. contained leaf roll, varying from a trace to 3%. In about 3 or 4 fields infection ranged from 2 to 3%. In one commercial field 15% of the plants were affected (W.K. McCulloch). Out of 3,203 fields in P.E.I., 3 were rejected on account of leaf roll. More fields than usual showed traces, probably on account of the symptoms being obscured in the hot dry season of 1935. (S. G. Peppin)

PSYLLID YELLOWS was severe at Medicine Hat, Alta. and at Calgary; a slight infection was present at the Station, Lethbridge, and on 2 city plots at Edmonton, where psyllid nymphs and adults were also observed. This is the first time it has appeared in Edmonton or has been epidemic at Calgary. (J. W. Marritt)

STEM ROT (Sclerotinia sclerotiorum) infection increased from 1 to 20% in the month ending September 24 in a field at Ste. Anne des Monts, Gaspé county, Que.; it caused some reduction in yield. In another field in the district 1% of the plants were affected (B. Baribeau). Affected plants were found in York and Carleton counties, N.B.

BLACK DOT (Colletotrichum atramentarium). Affected plants were received from a grower in zone 10, Alta., in 1933 who stated that the tops of the plants had died early. The isolated fungus was identified by Dr. G.R. Bisby. In laboratory tests in 1934, 1935, and 1936 the fungus had killed 100% of the stalks inoculated (G.B. Sanford). The disease was prevalent in York and Sunbury counties, on mature or dead potato stems. (J.L. Howatt)

FLA BEETLE INJURY was of minor importance this season in the potato growing areas of N.B. However, in a 2-acre field of Irish Cobbler in York county; almost all the tubers were injured. (J.L. Howatt)

Potryosporium longibrachiatum (Oud.) Maire was collected on dying and dead potato tops in the greenhouses at the Experimental Station, Fredericton, N.B. (J.L. Howatt and I.L. Connors)

TIP BURN (probably caused by leaf hoppers) was severe in a small garden at Farnham, Que.

FROST INJURY. Heavy frosts on Oct. 1, 4, 14, and 15 caused much injury in many localities of N.B. Nearly all the late potatoes were affected, the injury ranging from a trace to 10%. (J.L. Howatt)

MAGNESIUM DEFICIENCY caused slight injury to a field of Irish Cobbler in Kings county, P.E.I.

ARMILLARIA ROT (A. mellea) moderately affected the tubers of Green Mountain from a 1/2 acre field on newly cleared land at Milner, B.C. (W. Jones)

Phytophthora cinerea was found fruiting on the tubers in a field in zone 10, Alta.; it caused no damage. (G.B. Sanford)

LIGHTNING affected a large area in the centre of a field in Queens county, P.E.I. The tops were destroyed and after a week the tubers were rotting. (R.R. Hurst)

FERTILIZER INJURY. Tubers which had come in contact with potash sacks were received on two occasions at the

laboratory, Charlottetown, P.E.I. In one field in Queens county, 4.5% of the plants were injured where the tubers had come into contact with the fertilizer. Borax also caused slight to extreme injury to potato sets in one field. It was mixed by hand with the fertilizer, and applied broadcast by machine at the rate of 60 lb. per acre. The potato sets were then planted at once. Recovery from injury was remarkable; even some of the severely injured plants reached maturity to give fair yields. (H.L. MacLaren & R.R. Hurst)

WITCHES' BROOM (virus) was recorded in 47 out of 240 fields inspected and caused the rejection of 3 in B.C. Small amounts were seen in several fields in Alta. and northern Sask.

GIANT HILL (virus) was found in 126 fields out of 240 inspected in B.C. and caused the rejection of 3.

SPINDLE TUBER (virus) caused the rejection of one field in P.E.I.; it was present in very few fields, and usually only as a trace. (S.G. Peppin)

RHUBARB

CROWN ROT (Cause unknown). Ruby was the most severely affected by crown rot while Macdonald was the least diseased at the Experimental Station, Lacombe, Alta. Scattered dead or dying plants occurred in the other varieties.

LEAF SPOT (Ascochyta Rhei) occurred on the lower leaves of a few plants at Swift Current, Sask.; infection was moderate at Brandon, Man. Leaf spot (Phyllosticta straminella) moderately infected a small garden at Carrol's Crossing, N.B.

LEAF SPOT (Ramularia Rhei Allescher) was observed at High Prairie, Peace River district, Alta. by Dr. K. W. Neatby (4330) (A.W. Henry). This appears to be the first record of this leaf spot in Canada and the United States.

GREY MOULD ROT (Botrytis sp.). A specimen showing rot of leaves and petioles was received from Lond Island, N.S. at the Kentville Laboratory.

MOSAIC (virus). A few plants showing mosaic-like spotting were found at the Experimental Station, Fredericton, N.P.

ANTHRACNOSE (*Collletotrichum erumpens*) moderately infected some of the leaves at Brandon, Man.

FROST, on May 16, caused slight to severe damage to young leaves of rhubarb in York county, N.B.

SALSIFY

WHITE RUST (*Cystopus cubicus*) was common but caused slight damage at the Station, Summerland, B.C. It was severe and general in a field near Montreal, Que.

SPINACH

DOWNY MILDEW (*Peronospora Spinaciae*) was found on a few plants in a garden at Kentville, N.S.

WILT (?*Fusarium* sp.) was severe in a quarter acre field of Lent Standing Bloomsdale, being grown for seed at Grand Forks, B.C.; 75% of the plants were affected on July 29 and probably all will succumb before the end of the season. Affected plants wilt and then die. (G.E. Woolliams)

DAMPING OFF (*Pythium* sp.) caused considerable damage to spinach in the seedling stage when they were about 2 to 3 ins. high at Comox, B.C.

SQUASH

BACTERIAL WILT (*Erwinia tracheiphila*) had destroyed 10% of the plants in a planting in Lincoln county, Ont. by July 16, where the vines had been badly attacked by beetles early in the season. In another, 5% were diseased on July 23. It is a common disease. (G.C. Chamberlain)

MOSAIC (virus). Fifty per cent of plants were affected in a field in Lincoln county, Ont.

LEAF SPOT (*Alternaria* sp.) was reported on squash from one field in zone 10, Alta.

SWEET CORN

SMUT (Ustilago Zeae) affected 8% of the plants in a garden at Ste. Anne de la Pocatiere, Que.; a diseased specimen was received from Longueuil.

RUST (Puccinia Sorghi) was heavy in one corner of a large field at Farnham, Que., while traces only were present in the rest of the field and in one near by. Traces to heavy infections were reported at Charlottetown, P.E.I.

SWISS CHARD

CERCOSPORA LEAF SPOT (C. beticola) slightly infected swiss chard in a garden at Westboro, Ont. in 1934.

TOBACCO

In the preparation of the account below, the report of the Tobacco Disease Survey made by Dr. L.W. Koch has been freely drawn upon. My thanks are also due to Mr. Geo. E. Turcotte, Tobacco Inspector, for his report on tobacco diseases in Quebec.

(1) Seed Bed

An extensive survey of seed beds was carried out in the spring of 1936 in Ontario, particularly in the old tobacco belt in the counties of Essex and Kent; 59 seed beds were inspected in Essex and 72 in Kent. The diseases observed with the percentage of beds, in which each disease occurred, in Essex and Kent counties respectively, were as follows: Black Root Rot (Thielaviopsis basicola) 27%, 24%; Brown Root Rot (cause unknown) 27%, 9%; Black Leg (Erwinia aroidae) 70%, 72%; Frenching (cause unknown) 8%, 3%; Damping Off (Pythium spp., Rhizoctonia spp., etc.) 11%, 13%; Chlorosis (cause unknown) 25%, 21%; Fleishy fungi (Coprinus spp. etc.) 3%, 10%; Root Knot (Heterodera marioni) 3%, 0.

Black Leg, Frenching, and Root Knot are seedling diseases not previously reported in Canada and Brown Root appears to be an undescribed tobacco seedling trouble. It was present more commonly in steamed plant beds than those not steamed. The principal symptoms are a stunting of the plant accompanied by a general chlorosis of the foliage. The root system is also stunted and is discoloured in varying degrees. In the most severe cases only, very short brown

rootlets remained intact in the soil, while in mildly affected plants the root systems, though discoloured, appeared to be normal in size and were not decayed. The disease was more prevalent in Essex county, where 90% of the beds were steamed, than in Kent, where very few beds were steamed, but where fresh muck was generally used in the beds.

Black Leg was extraordinarily prevalent during the latter part of the period the plants were in the beds, probably because of the high humidity and lack of sunshine, and it either partially or completely destroyed the plants in numerous seed beds in both Essex and Kent counties.

In Quebec, Black Root Rot caused some damage in at least 50% of the plant beds. However, an improvement was noticed over 1934. Very few farmers use formaldehyde to disinfect their plant beds, but an increasing number change the soil in the beds every year or two. Damping Off was noticed in a few beds.

(2) Field

(a) Ontario

A field survey was conducted in the tobacco districts of Essex and Kent counties and to a limited extent in those of Norfolk and Elgin. Although records were kept of all tobacco diseases encountered, the survey was primarily to obtain a clear picture of the root rot situation. Dr. Koch has summarized his observations and his conclusions are here presented with some modification.

Table 7 - Kind and distribution of the root rots of tobacco in Ontario in 1936.

Kind of root rot	Number of fields in which root rot was observed				
	Essex	Kent	Elgin	Norfolk	Total
Brown Root Rot	49	10	4	3	66
Black & Brown Root Rots	3	6	1	1	11
Black Root Rot	9	21	6	1	37
TOTAL	61	37	11	5	114

BROWN and BLACK ROOT ROTS caused considerable loss in the field in Essex and Kent counties in 1936. While these diseases were also present in Norfolk and Elgin counties, the observations were not sufficiently extensive to assess the damage they caused.

Brown Root Rot (cause unknown) occurred consistently more often on the lighter soils than on the heavier ones, while the reverse was true for Black Root Rot (Thielaviopsis basicola). This is probably the reason why Brown Root Rot was more prevalent in Essex than in Kent county, while Black Root Rot appeared to be more severe in Kent than in Essex county, for, in general, the soils of Essex county are lighter than those of Kent.

Brown Root Rot was much more prevalent in fields where the preceding crop was corn or where manure containing corn refuse had been spread on the land than when other crops preceded tobacco in the rotation. Timothy also seemed to favour Brown Root Rot. On the other hand, Black Root Rot was more prevalent in fields where alfalfa or tobacco had been grown the previous year.

Although certain varieties are much more commonly grown than others, all varieties are not equally susceptible to root rot. Black Root Rot was prevalent on Kelley, while it was absent from Harrow Velvet. On the other hand, Brown Root Rot was found frequently on Harrow Velvet, Kelley, and Halleys Special, while only in a few instances was it found on the commonly-grown Judys Pride.

ANGULAR LEAF SPOT (Phytophthora angulata) was observed a few times in Essex county in August. Leaf spots were practically absent in Ont. until late in August, when a Leaf Spot (cause unknown) became prevalent throughout the Old and New Belts.

HOLLOW STALK (Erwinia carotovora) was seen in one field of Burley in Essex county in late August.

FRENCHING (cause unknown) was not as prevalent as in 1935, although it was observed in Essex, Kent, Elgin, and Norfolk counties.

HAIL INJURY. Two hail storms, the first on Aug. 19 and the second on Aug. 28, took a large toll of the Burley crop

in the Flenheim district and in the immediate vicinity of Harrow, including the crop at the Station. It was estimated that over half a million pounds each of flue and Burley tobacco were destroyed.

SUNBURN. All thin-leaved Burley and flue varieties suffered from sunburn in certain districts of Essex, Kent, and Norfolk counties in the latter part of July. The top and bottom leaves were most severely burned.

FROST destroyed practically all unharvested tobacco in the Delhi district on Sept. 24.

Isolated cases of Marbling (cause unknown) were observed on Burley and flue varieties up to Aug. 15, in the Harrow Station plots and in Essex and Kent counties.

(b) Quebec

BLACK ROOT ROT (Thielaviopsis basicola) was slightly more prevalent than in 1935 at Farnham, probably on account of the cool and rather wet weather early in the season. It was also destructive at L'Assomption, where it was estimated the yield was reduced from 10 to 15%.

ANGULAR LEAF SPOT (Phytomonas angulata) developed only slightly late in the season at Farnham, and no WILDFIRE (Phytomonas Tabaci) was seen.

HOLLOW STALK (Erwinia carotovora) affected a few plants in the cigar varieties at L'Assomption.

MOSAIC (virus) affected about 3% of the plants in the L'Assomption district. It was less prevalent than usual.

TOBATO

BLOSSOM-END ROT (Non-parasitic) was common in gardens about Sidney and Victoria, B.C. Often 5 fruits per vine were found affected. The weather was dry and the moisture supply varied greatly. The trouble was more severe than in previous years. It was noted in one field in zone 10, Alta. Small amounts of this rot were common in the gardens

at Saskatoon, Sask. A few affected fruit were observed at Swift Current, Sask., and at Morden, Man. The trouble was very common and widespread in P.E.I. and caused considerable damage.

MOSAIC (virus) was found in 4 out of 13 greenhouses in the Victoria district. It affected 2 to 90% of the plants in these greenhouses; the damage was 1%. A moderate infection of mosaic was recorded in one field in zone 10, Alta.

A few mosaic-infected plants were found in a small area in a large greenhouse planting of Grand Rapids in Lincoln county, Ont. These plants were from seed purchased elsewhere. Plants from their own selected seed were free from mosaic. Half the plants of Pritchard and John Baer in a field in Wentworth county were affected with mosaic. Occasional plants affected with mosaic were observed in gardens in York county, N.B. All the plants in a garden in Queens county, P.E.I., were diseased.

LEAF MOULD (Cladosporium fulvum) was found in 8 out of 13 greenhouses in the Victoria district, B.C., infection ranged from 8 to 100%, and the damage was less than 1%. A very severe outbreak occurred on the fall crop in a commercial greenhouse at London, Ont.; the plants were defoliated and the crop destroyed. It was very severe in greenhouses at Falmouth and Dartmouth, N.S. The crop was reduced 30%.

EARLY BLIGHT (Alternaria Solani) was general in the field at Mission and Agassiz, B.C. and caused 1 to 5% damage. Sometimes the fruits were attacked slightly. It was present at L'Assomption, and was abundant at Farnham, Que. A very severe infection occurred on a piece of land continuously cropped to tomatoes at Burton, N.B. The leaves and stems were severely affected and the fruit crop was greatly reduced and of poor grade. It also caused slight damage at Maugerville. It caused slight to severe damage in Queens county, P.E.I.

LATE BLIGHT (Phytophthora infestans) caused slight damage at Maugerville, N.B. It destroyed entire crops in Queens county, P.E.I., especially where the vines were not staked.

SEPTORIA LEAF SPOT (S. Lycopersici) rather severely infected the lower leaves of plants in cold frames in Lincoln county, Ont. A slight infection was present in a small garden at L'Assomption, Que. It caused slight defoliation in a garden at Kentville, N.S.

WILT (Verticillium sp.) was found in 8 greenhouses out of 13 in the Victoria district, B.C. In one, 80% of the plants were affected with a corresponding loss; in the others about 1% of the plants were showing wilt. Wilt (Fusarium sp.) was affecting specimens received from Renfrew, Ont., at the Ottawa Laboratory.

BACTERIAL CANKER (Phytophthora michiganensis). A single affected plant was seen at Summerland, B.C. The seed had been sent to the Station for trial.

STEM ROT (Sclerotinia sclerotiorum) was noted in one patch of tomatoes in zone 10, Alta.

DAMPING OFF (Rhizoctonia Solani) appeared suddenly on Jan. 9, in a planting of 22,000 plants being grown for a spring greenhouse crop in Lincoln county, Ont. The plants were grown in sterilized soil and the seed was disinfected. The source of the infection was possibly the seedling flats or the water which was drawn from a nearby creek. The weather was overcast. By Jan. 13, 60% of the plants were affected. Chesnut compound checked the trouble. (G.C. Chamberlain)

GREY MOULD (Botrytis sp.) was present in 2 out of 13 greenhouses in the Victoria district, B.C.; the damage was a trace.

ROOT KNOT (Heterodera marioni) was found in 3 out of 13 greenhouses in the Victoria district, B.C.; in these 3, infection ranged from 60 to 90% and the damage from 1 to 10%. (J. E. Boshier)

GAS INJURY (illuminating gas) appeared in March in flats of seedlings grown in a greenhouse heated by illuminating gas at Leamington, Ont. It caused marked twisting of leaf and petiole, but the damage was slight. (G.C. Chamberlain)

SUN SCALD ruined 50% of the early crop in Lincoln county, especially on early stalked tomatoes. The temperature rose to 104° F.

STEM ROT (Pythium sp.) destroyed several thousands of seedlings being grown at Douglas, N.B. Fresh manure was placed in the propagating flats. (J.L. Howatt)

TURNIP

CLUB ROOT (Plasmodiophora Brassicae) affected 6% of the plants in a planting at St. Felix de Kingsey, Que. (B. Bari-beau). Club root occurs throughout N.B., wherever soil conditions are satisfactory for its development. So-called resistant varieties show varying degrees of resistance according to location, soil type, etc. There is also some indication of physiological specialization of the causal organism (J.L. Howatt). The disease affected 10% and 25% of the crop respectively in two fields, one in Pictou and the other in Colchester county, N.S. In the latter county many healthy and vigorous crops were observed (W.K. McCulloch). In P.E.I., club root affected all varieties except Wilhelmsburger, which was grown extensively this year on account of its disease resistance. (R.R. Hurst)

BROWN HEART (non-parasitic) was general on turnips throughout N.B., where boron was not applied to the soil. The losses were severe where the intention was to export the crop for human consumption. The feeding value for livestock was, however, little reduced unless secondary rots appeared (J.L. Howatt). It was prevalent at Kentville, N.S. in those fields where fertilizer containing boron was not applied (K.A. Harrison). Brown heart was less prevalent this year in P.E.I., due to the more general use of fertilizer containing boron. Where brown heart was present, the disease was detected in the field and therefore very few turnips were rejected on account of it at the shipping points. Commercially-prepared borated fertilizer applied broadcast or in the drill gave good control. (R. R. Hurst)

BORAX INJURY was slight to severe in a field of turnips in Queens county, P.E.I. The turnip seed was sown immediately after the borax, which had been mixed by hand with the fertilizer, was applied by machine at the rate of 60 lb. per acre. (R.R. Hurst)

STORAGE ROT (Rhizoctonia Solani) was very destructive in Queens and Kings counties, P.E.I., both last year and this. The disease was determined by M. Timonin by isolating the organism from turnips received on Jan. 20, from Papineau county, Que., at the Ottawa Laboratory.

SCLEROTIAL ROT (Sclerotinia sclerotiorum) caused considerable damage in storage on one farm at Pemberton Meadows, B.C.

It, however, was not general in the district, where a fair quantity of turnips is grown for the market. (H.C. MacLeod)

BLACK LEG (Phoma lingam) caused slight to severe damage to all varieties of turnips in storage in P.E.I.

MOSAIC (virus) infected 2 plants on a farm in York county, N.B.

COMMON SCAB (Actinomyces scabies). Traces of scab were present on several varieties in Queens county, P.E.I.

WHITE SPOT (Cercosporella albo-maculans) moderately infected Hazards Improved at the Experimental Station, Charlottetown, P.E.I.

IV. DISEASES OF FRUIT CROPS

APPLE

SCAB (*Venturia inaequalis*) was rare at the Station at Summerland, B.C. It was of minor importance in the Niagara Peninsula, Ont. in 1936. Unsprayed McIntosh trees at the Laboratory farm, St. Catharines, had 35% of the foliage infected, but the infection was light and mostly on the late season growth. On sprayed trees infection was very scattered and light. It was quite prevalent in Durham county; foggy weather in the early season provided conditions favourable for infection.

Scab moderately infected both leaves and fruit of young Melba trees at La Fresniere, Que.; the trees were not properly sprayed. At Ste. Anne de la Pocatiere, scab was light in well sprayed orchards, Fameuse and McIntosh being the most affected. However, in an unsprayed orchard of old trees, scab was severe and the crop was poor, about 50% of the fruit being scabby. It was even more severe on a crab-apple tree. At Cap Rouge infection was very light except on Galetta, which was severely affected. In small home orchards at St. Elzear, Bonaventure county, the trees were often relatively free of scab, although unsprayed. However, in one orchard in which there were 3 trees, the leaves on a crab-apple tree were yellow from scab and the tree next to the crab bore a moderately scabby crop while the third tree was only slightly affected.

Scab was severe on unsprayed trees, or those poorly sprayed, in N.B. Satisfactory control was obtained where the standard spray programme was carried out. Ascospore discharge began May 4, and was unusually heavy. (S. Clarkson)

The first ascospore discharge at Kentville, N.S., took place on April 27 and the first conidia were present on new growth on May 19. These infections were mostly on the upper leaf surfaces. By June 2, 75% of the foliage was affected on some unsprayed trees and scab was common on the fruit and pedicels. Late infections were apparent on the fruit in early September and later infections were abundant during October. (J. F. Hockey)

A survey in P.E.I. indicated that apple scab was abundant in 1936. Where a regular spray schedule was followed, control of scab was good and in spite of a very rainy season, the disease was completely controlled. (R. R. Hurst.)

FIRE BLIGHT (Erwinia amylovora) was unusually prevalent in the Okanagan valley, and although the damage was small, the disease may be destructive in 1937 unless the cankers are cleaned out before next season. Fire blight caused a trace to severe damage among the 36 apple hybrids, being grown in the University orchards, Saskatoon, Sask.; the average damage was moderate. Fire blight infection was slight at Morden, Man., and severe at Winnipeg.

In a large orchard at Queenston Heights, Ont. moderate to severe infection of blossoms and twigs occurred on Greening; some cankers from last year's infection and a few old cankers were present. Slight blossom and twig infection occurred on McIntosh in the same orchard; no old cankers were seen. On the other varieties present only a trace of infection developed. Fire blight caused slight blossom and twig infection on Tolman Sweet and a trace on Northern Spy in orchards at Port Dalhousie, Ont.

There was very little fire blight in western Quebec in 1936 and what there was developed on Alexander, Winter Arabka, Canada Baldwin, on certain crab-apple varieties, and on a few trees of other varieties growing in close proximity to those enumerated above. Where the susceptible varieties were absent the orchards were free from blight. At Abbotsford, fire blight was present in only 5 orchards. In these, 5% of the blossoms of Alexander and Winter Arabka were affected, with a slight amount of twig infection later. In one orchard old cankers on a few Canada Baldwins exuded freely during the season, but no new infections developed. In another 19% blossom infection occurred on a Queens Choice crab with some twig infection later on. In the Rougemont and St. Hilaire districts, Alexander was slightly to moderately infected in a few orchards where it is grown. In the Chateaugay district a trace of blight was present in a few small orchards on Alexander. In Franklin Centre fire blight was very severe on about 12 Alexander trees in a neglected orchard of 30 trees. Light infections were noted in a few orchards in West Sherford, but no blight occurred at Frelighsburg, Hemmingford, Covey Hill, and St. Joseph du Lac. A trace of blight was present on a tree of Pyrus baccata in Missisquoi county.

In eastern Quebec the epidemic of fire blight that reached its height about 1931 has not completely subsided for most orchards are still moderately infected. The varieties affected in descending order of severity are Alexander, Wolf River, crabs, Wealthy, Yellow Transparent and Duchess. Since the winter of 1933-34, when most of the McIntosh and Fameuse trees were winter-killed, the Wealthy is the dominant variety and as it is generally affected it appears to be the

most susceptible. When, however, Alexander is present, it is found to be more severely diseased. Fire blight infections were noted as follows: slight amount along the north shore of the St. Lawrence from Quebec to St. Joachim; moderate at Ste. Famille, Isle of Orleans, and on the south shore around St. Nicolas and at St. Michel; slight at St. Valier, St. Roch and Village des Aulnaies; and on one tree of Fameuse at Ste. Anne de la Pocatiere.

Fire blight was heavy on a few trees in an abandoned orchard in P.E.I.

BLACK ROT (Physalospora obtusa (Sphaeropsis malorum)). Pycnidia of the fungus were found on a black rot canker on May 11 at Ste. Anne de la Pocatiere, Que. (C. Perrault). As a leaf spot the disease was less severe in N.B. than in previous years and consequently little defoliation occurred in affected orchards. It caused moderate leaf infection in a few orchards in York and Sunbury counties. Black rot caused a trace of damage on Duchess at Kentville, N.S.

RUST (Gymnosporangium clavipes). A trace of rust was present on Melba at Ste. Anne de la Pocatiere, Que.; aecia were mature about July 10.

POWDERY MILDEW (Podosphaera leucotricha) slightly infected McIntosh at Summerland, B.C.

ANTHRACNOSE (Neofabraea malicorticis) caused 20% damage in a 10 acre orchard of Ontario at Duncan, B.C. The disease is fairly general over Vancouver Island and the lower mainland. Northern Spy is apparently more resistant than other varieties grown. The disease is best controlled by spraying with Bordeaux before the fall rains begin. "Buisol" also is fairly effective and has the advantage that it does not discolour the fruit (W.R. Foster and W. Jones). From examinations of material from B.C., Dr. W. J. Groves, now at the Ottawa Laboratory, and who has been making a study of the Dermateaceae in Ontario, has concluded that this fungus is not a Pezicula. In his opinion it should be retained in the genus Neofabraea, which Jackson erected with N. malicorticis as the type species. (I.L. Connors)

EUROPEAN CANKER (Nectria galligena). About 8 cankers of various size were found on a large 20 year old McIntosh tree

in an orchard in Levis county, Que.; a few trees had 1 or 2 cankers each, while the other 30-60 trees were clean. Mature perithecia present on the dead bark agreed with the description of *N. galligena*. (H.H. MacIsaac and F.S. Thatcher). It was present on a few small trees at the Experimental Station, Kentville, N.S.

CROWN ROT (Non-parasitic) affected several trees at the Station, Summerland, B.C.

BROUGHT SPOT and CORKY CORE (Non-parasitic) was severe on untreated trees, sometimes all the apples on a tree being affected in the Okanagan valley, B.C. Nevertheless success obtained in the control of these types of physiological disorders by means of boric acid has resulted in the addition of 40,000 boxes of perfect fruit to the 1936 harvest of the Okanagan growers. (H.R. McLarty)

It occurred sporadically on McIntosh and Fameuse in York and Sunbury counties, N.B.

BITTER PIT (Non-parasitic) was severe on Baxter and Wealthy apples in Queens and Sunbury counties, N.S. Tree injections with borax did not appear to be beneficial.

Bitter Pit of the Blotchy Cork type was severe on Stark in the Annapolis valley, N.S. in 1936. From 40 to 50% was found in different parts of the valley. In one orchard with a very light crop, 83% of the fruit was affected. In another in the same district, but on a different type of soil, less than 1% was injured. (K. A. Harrison)

WATER CORE (Non-parasitic) affected the fruits, which were larger than usual, on one tree of Melba at Cap Rouge, Que. The fruit from a few trees have been found affected in N.S. The number showing water core may vary from a trace to 90%. The trouble apparently disappears during prolonged storage. (J. L. Howatt)

WIND BLIGHT (*Noctua cinnabarina*). A trace was found at Ste. Anne de la Pocatière, Que. It is occasionally seen on trees weakened or injured during the winter of 1933-34 in York and Sunbury counties, N.B.

WOOD ROT (Schizophyllum commune) was found on the trunk of a tree in the University orchard, Saskatoon, Sask.; some of the limbs of the tree are dying. It is found in orchards throughout N.B., where the trees were badly injured in the winter of 1933-34.

SILVER LEAF (Stemium purpureum). A slight infection was reported at Morden, Man. A few among about 1,000 seedling trees were found affected at the Stations at Fredericton, N.B. and Kentville, N.S. It was found on 65% of the trees in one orchard in Queens county, P.E.I., as well as on wild trees.

CANKER (Cytospora sp.) was severe on one tree each at Saskatoon and Swift Current, Sask.; it was also reported from Indian Head. As a twig blight it is common on trees which have suffered winter injury.

STORAGE ROTS. The following fungi were found causing rot on apples in storage at the Station, Fredericton, N.B. from Dec. 1935 to April 1936: Botrytis sp., trace; Sclerotinia americana, trace; Penicillium ?candidum, 1%, determined by Dr. J. Dearnness; Fusarium sp., trace; Rhizopus nigricans, trace; Alternaria Mali, trace; Dasyscypha allantoideum (Peck) Dearnness, 6% of 10,700 apples examined. This is a new storage disease which was found on Dudley, Wealthy, McIntosh, Fameuse, Milwaukee and Golden Russet; 18.1% of the Fameuse were affected. Dr. Dearnness has erected a new genus for the fungus which was formerly known as Gloeosporium allantoideum. (J.L. Howatt and S. Clarkson)

PINK ROT (Tricothecium roseum) was affecting a few scabby apples at Fredericton, N.B. in Nov. 1936.

SCORCH (Potassium deficiency). A large orchard in York county, N.B. was found with several trees affected with what was thought to be leaf scorch.

WINTER INJURY was severe on young trees and grafts up to 7 or 8 years old in the Okanagan valley, B.C. The injury was mostly in the trunk, but in some cases the branches were also affected. The temperatures were: Oct. 31, 15°F; Nov. 1, 14°F; Nov. 2, 13°F; and Nov. 3, 13°F.

JONATHON SPOT (Non-parasitic) affected all the Macoun apples in store at the Station, Fredericton, N.B.

SUN SCALD and WINTER INJURY caused rather extensive dead areas on the south-west side of the trunks, partially girdling them, in an orchard of Duchess apples and Harlet pears in Wentworth county, Ont. The orchard has an exposed location.

SUN SCALD of all exposed fruit was common following the extreme heat in early July in Lincoln county, Ont.

FROST slightly injured young apple leaves on May 16 at Burton, N.B.

LEAF SPOT (Cause unknown). A leaf spot, usually associated with the leaves in a fruit cluster, was very prevalent in the St. John River valley, N.B. Affected leaves showed numerous, pinpoint, ragged, red spots. Such leaves were usually small and dropped early.

SPRAY INJURIES on the foliage were common in the Annapolis valley, N.S., and were aggravated by frost, and aphid injuries. A variety of injuries from different spray schedules have been found, some of which have not been accounted for. (J. F. Hockey)

APRICOT

WINTER INJURY was severe in some places in the southern Okanagan valley, B.C. in Feb. 1936, possibly affecting 50 of the trees. The injury was most severe on the trunks and buds and the crop was a complete failure. The temperatures were:

Feb. 7	-16°F.	Feb. 12	9°F.	Feb. 16	-8°F.
" 8	-15°F.	" 13	-8°F.	" 17	-8°F.
" 9	-10°F.	" 14	-11°F.	" 18	-5°F.
" 10	1°F.	" 15	-10°F.	" 19	-1°F.
" 11	8°F.				

The apricots came through the November cold spell very well, but it caused severe injury to apples (See Apple).

BLACKBERRY

SEPTORIA LEAF SPOT (S. Rubi) was moderate on cultivated blackberry at Lennoxville, Que., in 1934.

CHERRY

SHOT HOLE (Higginsia hiemalis (Cylindrosporium hiemale) caused slight damage on Vancouver island, B.C., and in the Fraser River valley. It was present on specimens from Oakville, Ont., received at Ottawa. A slight infection was noted at the Experimental Station, Charlottetown, P.E.I.

BROWN ROT (Sclerotinia americana) caused 5% damage at Elk Lake, B.C. It also was present on the lower mainland. A trace of brown rot was recorded at Kentville, N.S.

BLOSSOM BLIGHT (Sclerotinia cinerea) was present on most trees on Vancouver Island and in the Fraser River valley, B.C., the damage ranging from 0 to 50%.

WITCHES' BROOM (Taphrina Cerasi) was found on one tree in an orchard at Elk Lake, B.C.

SPLITTING caused heavy losses to sweet cherries on Vancouver Island, B.C. on account of rain when the fruit were ripe; in some orchards almost all the fruit were affected. Where the orchards were sprayed with Bordeaux or Buisol the percentage of cherries affected was reduced considerably. Sour cherries were not affected as these varieties were not yet ripe. (W. R. Foster and W. Jones)

ARMILLARIA ROT (A. mellea). A few trees were killed by this fungus at the Sidney Experimental Station, B.C. The symptoms of chlorosis, die back, and gumming present in some orchards seem to indicate that it may be more general than supposed. The fungus was responsible for the death of numerous wild cherries (Prunus emarginata) in the Milner district, B.C. and has also been found on wild trees around Sidney. (W. Jones)

HEART ROT (Fomes applanatus). The fungus was found fruiting on a sweet cherry tree at Summerland, B.C.

GUINIOSIS (Cause unknown) was less prevalent on sour cherries than usual in Queens county, P.E.I., only traces being observed. (R. R. Hurst)

FROST caused slight injury to scattered Montmorency trees in an orchard in Lincoln county, Ont., causing a

failure of bloom, and a spotting and stunting of the foliage mostly on the upper parts of the tree (G.C. Chamberlain). Frost caused some injury to the young leaves of cherries in York county, N.B. on May 16.

CRANBERRY

RED GALL (Synchytrium Vaccinii) was severe in a bog at Port Mouton, N.S. The disease was reported from the same bogs in 1933 (see P.D.S. 13:51. 1934).

RED LEAF SPOT (Exobasidium Vaccinii) slightly infected one bog at Egmont Bay, P.E.I., out of 4 visited on July 8. (E. H. Saunders)

CURRENT

WHITE PINE BLISTER RUST (Cronartium ribicola J.C. Fischer) was general on Vancouver Island and in the Fraser River valley, B.C. and caused moderate damage. It was severe on black currants at Summerland.

The currant and gooseberry plantings of the Horticultural Division, Ottawa, Ont. were inspected at regular intervals during July and August. Although the rust was not as severe as it was last year, several varieties which were free from infection in 1935 were slightly affected this year. Of the red varieties, Viking, Franco German, and Ribes Manchurica (?manchuricum) were free both years, the latter was accidentally omitted from the list last year. Of the black currants, bush 19/11 of a variety from the Siberian Horticultural Station was found free of rust; bush 9/4 from the same source, although not affected last year, was slightly rusted in 1936 (H.J. Read). Rust was prevalent on red currant at Farnham, Que. Blister rust was common in York and Sunbury counties, N.B., on red and white cultivated currants and on wild species of Ribes. Traces were found on gooseberry (J.L. Howatt). This rust was abundant in plantations of black currant at Kentville and Amherst, N.S. Rusted specimens were also received from Lunenburg, Annapolis, and Halifax counties. Rust was reported on red currant at Charlottetown, P.E.I.

POWDERY MILDEW (Sphaerotheca mors-uvae) moderately infected red, white, and black currants at the Station, Summerland, B.C. It caused moderate damage to black currant at Saskatoon, Rosthern, and Codette, Sask.

SEPTORIA LEAF SPOT (S. Ribis) slightly infected red and black currants at Indian Head, Sask.; it was also present on the flowering currant. Black currants were found infected at the Station, Kapuskasing, Ont. (4024), in 1935. A moderate infection was noted in one garden in York county, N.B.

ANTHRACNOSE (Gloeosporium Ribis) slightly infected the lower leaves of red currant at Indian Head, Sask.

CORAL SPOT. A number of canes, bearing Nectria cinna-
barina, was pruned out of a garden at Kentville, N.S.

GOOSEBERRY

POWDERY MILDEW (Sphaerotheca mors-uvae) was severe on Poorman at the Station, Summerland, B.C.; none was found on Oregon Champion. It was heavy on the fruit of Industry, an English variety, in a garden in Lincoln county, Ont. A moderate infection was noted in one garden in Queens county, P.E.I.

WHITE PINE BLISTER RUST (Cronartium ribicola). All varieties of gooseberries were more or less rusted in the plantings of the Horticultural Division, Ottawa, Ont. (H.J. Read). Specimens of the rust on gooseberry were collected by Miss Watts and have been preserved in the Division of Botany herbarium (I.L. Connors). Rust was moderate at Farnham and slight at Cap Rouge, Que.

SEPTORIA LEAF SPOT (S. Ribis) caused a slight infection in one garden in York county, N.B.

ANTHRACNOSE (Gloeosporium Ribis) was serious in some plantations on Vancouver Island and in the Fraser River valley, B.C. Lime Sulphur has not given control on the lower mainland. (W. Jones)

GRAPE

DEAD ARM (Fusicoccum viticola) was present on about 10% of the vines of Concord in a vineyard at Port Dalhousie, Ont.

WINTER INJURY. Several complaints about the dying of grape vines, principally of the Niagara variety, were inves-

tigated in Lincoln county, Ont. The tissue of the crown had been killed; the vines leafed out, but died as soon as the weather became warm and dry. In most vineyards cultivation in the previous year had been continued until quite late (end of July) which may have prevented the wood from maturing before winter. (G.C. Chamberlain)

SHELLING (Mineral deficiency?) was found occurring on a few vines in one area in Lincoln county, Ont. Soil samples analysed by the "Rapid Soil Analysis" method, indicated a potash deficiency where shelling was most marked. Tissue analysis also showed that the affected vines were low in potash, while healthy vines had a high potash content. (G.C. Chamberlain)

LOGANBERRY

ANTHER and STIGMA BLIGHT (Haplospheeria deformans) was prevalent at Elk Lake, B.C. and caused 10% damage. A slight infection was present at Gordon Head. The disease is most prevalent in humid areas where air drainage is poor. (W.R. Foster)

NECTARINE

POWDERY MILDEW (Sphaerotheca pannosa) was slight at the Station, Summerland, B.C.

PEACH

LEAF CURL (Taphrina deformans) caused a slight infection on most varieties in Lincoln county, Ont.; the damage was virtually nil.

POWDERY MILDEW (Sphaerotheca pannosa) was moderate on several trees at the Station, Summerland, B.C. A moderate infection developed on June Elberta in an orchard in Lincoln county, Ont. The orchard was close to a bush and the weather had been foggy. Late Elberta in the same orchard was not affected.

BROWN ROT (Claserotinia americana) was practically absent from orchards in Lincoln county, Ont. and was not evident in stored peaches during 1936. Low humidity and

extreme drought, which prevailed until early September, probably served to reduce the incidence of the disease.
(R. S. Willison)

YELLOW S and LITTLE PEACH (virus). Outbreaks of virus diseases, particularly of little peach, and often of considerable extent, were observed in various parts of the Niagara peninsula, Ont. Several cases of little peach and a few of yellows were identified in the Laboratory orchard, St. Catharines. (R.S. Willison)

BUMPY FRUIT (Undetermined, probably non-parasitic). This trouble, first reported in 1935 in an orchard in Lincoln county, Ont., was not so serious in 1936, although a few fruit were affected. A similar case was observed by Mr. M.L. Schenk in an orchard on the north shore of Lake Erie; affected fruits were brought to the St. Catharines Laboratory. (R.S. Willison)

WINTER INJURY was severe in the southern Okanagan valley, B.C. in February 1936 (see under Apricot). Injury to the buds and twigs cut the crop to half the usual amount. In most cases the trunks were severely browned, but the cambium remained alive. In a very few instances, however, the trees were killed. (H.R. McLarty)

COLLAR ROT (Low soil temperature) was observed in Lincoln county, Ont. Injury was usually evident at the soil level or a few inches below. The amount of damage varied from complete girdling to small brown areas on the trunk. Roots near the surface of the soil also showed signs of injury. The soil temperature in February, 1936 was much lower than normal; on one occasion at Vineland it was 13°F. There were indications that this type of damage may vary with cultural practices and fertility levels. (R.S. Willison)

LEAF SCORCH (Potash deficiency). A 2-year old orchard was observed showing marked symptoms of marginal scorch. When the soil was analyzed by the "Rapid Soil Analysis" method, it showed no potash or phosphate and low nitrate and nitrite. The soil was slightly alkaline, probably high in lime. The trouble is becoming of increasing importance.
(G. C. Chamberlain)

WILT (Verticillium sp.) affected 5% of the Vidette trees in a 5-year old orchard of mixed varieties in Lincoln

county, Ont. Diseased branches were defoliated. The orchard was intercropped for 2 years with tomatoes. (C.C. Chamberlain)

SCAB (Gladosporium carbonhilum) caused a scattered infection of St. John and Rochester in an orchard in Lincoln county, Ont.

FRUIT BREAKDOWN (Non-parasitic) was moderate in Elberta peaches, especially when the fruit was held in cold storage at 33-36°F. for several days in Lincoln county, Ont. The signs were: (1) First a reddening of the flesh in line with the suture of the pit, with browning within red areas especially near the stem end; (2) Later a browning of the flesh sometimes preceded by a diffuse reddening, with or without the early signs. The first symptoms were not evident in Rochester peaches studied at the same time, but the second appeared in some cases after storage for several weeks. Weather conditions at the time of ripening may be a predisposing factor. (R. S. Willison)

CROWN GALL (Phytoplasma tumefaciens) affected 30 to 50% of trees of various varieties in an orchard in Wentworth county; there was a heavy growth of gall at the crown of young budded stock. The soil was a heavy clay with slightly acid reaction. (G.C. Chamberlain)

PEAR

FIRE BLIGHT (Erwinia amylovora). Diseased fruit of Flemish Beauty were sent from Erickson, B.C. by Mr. C. B. Twigg, District Agriculturist, to the Summerland Laboratory. It was general at Summerland. Many old fire blight cankers were seen in an old neglected pear orchard containing 17 varieties at Port Dalhousie, Ont.; blossom and twig blight was slight to a trace. In another orchard of 1,300 Bartlett trees, twig infection occurred on 3 trees. In a commercial orchard at St. Catharines, Ont., some old cankers were observed, but no new infection was present. (H.N. Macleod)

SCAB (Venturia pirina) was general on Vancouver Island and on the lower mainland of B.C. In an unsprayed orchard at the Station, Sidney, it was heavy and caused 50% damage on Anjou, the worst infected variety. Scab was present on all pear trees grown in P.E.I. in 1936, but the damage was slight.

WINTER INJURY occurred on a quarter of the trees belonging to different varieties in an extensive 3-year old planting on East Malling root stocks A, B, and C. The injury showed up this spring. Trees on C stock appear to be the worst affected. (G.C. Chamberlain)

PLUM

BLACK KNOT (Dibotryon morbosum). A trace was recorded at Brancon, Man. A very heavy and unusual outbreak of black knot was observed in a 4-year old orchard of Lombard plums in Lincoln county, Ont. Not a limb, branch, or twig was free from serious infection. Of the 30 trees of this variety, 24 were so seriously involved that they would have to be destroyed. Italian Prune growing along side were slightly affected. The source of infection was apparently diseased wild plum and cherry trees in a neighbouring bush (G.C. Chamberlain). Specimens of black knot were received from Ste. Justine and Ormstown, Que. The disease was observed occasionally in York and Sunbury counties, N.B. Black knot was found in several orchards about Kentville, N.S. A severe outbreak of black knot occurred in P.E.I. on both cultivated and native plums. It is suggested that the unusually rainy season of 1936 favoured the disease. (R.R. Hurst)

PLUM POCKET (Taphrina Pruni). A trace was reported from Brandon, Man. Diseased specimens were received at Ottawa from Iroquois, Ont., and Chambly, Que. It affected 10% of the plums in 2 small orchards out of 6 examined at scattered points in Que. (B. Baribeau). The crop was almost a total loss on unsprayed trees in an orchard in Inverness county, N.S.; practically perfect control was obtained in Kings county, where the trees were sprayed (J.F. Hockey). Plum pocket was severe in a small orchard in P.E.I.

A trace of plum pockets (T. communis) was found in the orchard at the Experimental Farm, Indian Head, Sask.

BROWN ROT (Sclerotinia americana) was general in Vancouver Island, B.C. For some varieties, 80% of the fruit were destroyed at the Sidney Station. Victoria and Ponds Seedling were the worst affected. Brown rot affected up to 60% of the fruit on some unsprayed trees in the Gaspercaux valley. Traces of brown rot occurred on Magnum Bonum in an orchard in Queens county, P.E.I.

RUST (*Tranzschelia Pruni-spinosae*) appeared late in the season at the Station, Sidney, N.S. (4220). It caused no appreciable damage.

SHOT HOLE (*Wormhole* *Pruniphora* (*Cylindrocarpon* *Pruniphora*)). A trace was observed at Horton, N.B. Diseased specimens were received from Oakville, Ont. Shot hole was general on wild and cultivated plums in York and Sunbury counties, N.B. The disease was general on cultivated plums in Kent county, N.S. and caused some defoliation (J.A. Doyle). Shot hole caused heavy leaf injury in 1936 in N.S.I. and it has not been successfully controlled by spraying. Quackenbush and Glass Seedling, although sprayed 6 times with Lime Sulphur and Iron Sulphate, were severely defoliated, suffered moderate twig injury, and dropping and shrivelling of the fruit, due to shot hole. The varieties, John A. Latchford, Lombard, Gage, and Columbia, were not seriously affected. (G.C. Warren)

A CHLOROSIS, accompanied by more or less severe leaf scorch, was observed on several varieties of plums in the 8-year old orchard of the Laboratory at St. Catharines, Ont. A virus disease is suspected, probably similar to yellows or little peach. Affected trees are being kept under observation and grafting experiments are being carried out to determine if the trouble is transmissible. (R.S. Willison)

QUINCE

RUST (*Gymnosporangium clavipes*). One rusted fruit was sent from Melvern Square, N.S. to the Kentville Laboratory (K. A. Harrison). Leaves affected with rust (*G. clavipes* *ferre*) were collected at the Station at Kentville in 1936 by J.P. Hockey, but the organism was not determined until July, 1936. This year about 5% of the leaves were found rusted in the same orchards according to J.A. Doyle, but specimens were not kept. (I.L. Connors)

RASPBERRY

SPUR FLIGHT (*Didymella applanata*) is widely distributed on Vancouver Island and the lower mainland, B.C.; the damage is apparently slight (W. Jones). The disease was moderate on canes of Brighton sent from Middlesex county, Ont., to the St. Catharines Laboratory; a trace was observed at Dunrobin.

Spur blight was rare in Quebec in 1936. Traces were present in most plantings of Latham and Herbert inspected; however, it was severe in Shefford county, in one planting of Latham, where the rows were too wide and the canes very thick. Traces only were found in one planting each of Marlboro, Cuthbert, Newman, and Chief (H. N. Racicot). The disease caused slight to severe damage in plantings in York, Sunbury and Westmoreland counties.

SEPTORIA LEAF SPOT (S. Rubi) was seldom seen this year in Lincoln county on account of unfavourable weather conditions, although it is usually quite common; a slight infection was recorded on Viking (G.C. Chamberlain). A trace was found on Herbert at Dunrobin. It was observed in a garden patch in Wright county, Que.

MOSAIC (virus) is uncommon in the raspberry growing areas of B.C. However, it affected 5% of the plants in a Lloyd George plantation on Vancouver Island and 50% of the plants of an unnamed English variety near Vancouver. Other reports were 10% of mosaic on Newman at Salmon Arm and 50% of the stray plants at the Station, Summerland. In Alta., a trace was found on Latham at Lacombe, the disease was apparently masked this year.

A survey of several commercial plantations in Northumberland county, Ont., showed that mosaic was prevalent. In one Cuthbert planting, mosaic affected 80% of the plants and infections ranging from 25 to 40% were common. The disease was more prevalent on Cuthbert than on either Viking or Latham (G.C. Chamberlain). Mosaic affected 3% of the Latham plants and 1% of Starlight at Dunrobin. The disease probably spread from infected wild raspberries growing near the plantation. (H. N. Racicot)

The percentage of mosaic found in the nursery plantations inspected in Que. was usually small. The highest recorded for Latham was 15%, for Newman, 2%, Herbert, trace and Viking 1.7%. Traces were also observed on Cuthbert, Chief, Brighton, Golden Queen and Marlboro, while Newburg was free. In fruiting plantations the highest percentages recorded were: in one of Newman, 19.5%; in one of Chief, 19%; in one of King, 6%; the percentages in Latham and Viking were 1% or less and no mosaic was seen in Newburg, Adams 87, and Ulster. (H. N. Racicot)

Mosaic was widespread in N.B. and was found on all commercial varieties; the percentage of infected plants varied from a trace to 100% (J.L. Howatt). A few plants

were rogued out of the Station plantation at Kentville, N.S. on account of mosaic. Mosaic was found in all 3 counties of P.E.I.; infection ranged from slight to severe. It has been troublesome except in well rogued plantations, but certified Viking stock grown locally is being used to establish more and more disease-free plantations. (R.R. Hurst)

LEAF CURL (virus) affected from 1 to 10% of the plants in all Cuthbert plantings visited during a survey in Northumberland county, Ont. Leaf curl was not observed in the 94 nurseries inspected in Que., and only traces were found in two plantations of Viking in Nouvelle county. Growing near one of these plantations of Viking were Newman, Latham, Chief, Newburg, King, and Adams 87, which were all free from the disease (H. N. Racicot). Leaf curl was found in 2 gardens near St. John, N.B. and in one near Fredericton. (D. J. MacLeod)

ANTHRACNOSE (Elsinoe veneta). Infection was general on leaves and petioles of fruiting canes of Lloyd George at Agassiz, B.C. The current season's canes were slightly infected. Lloyd George is apparently more susceptible than any of the other popular varieties (W. Jones). Little anthracnose was observed in 1936 in Que. In nurseries infection was light on 5% or less of the canes of Newman, while traces were observed on Herbert, Viking, Cuthbert, Brighton, and Marlboro and none on Latham, Chief, Newburg and Golden Queen. It was not observed in fruiting plantations (H.N. Racicot). Anthracnose was found on 20% of the fruiting canes in one patch in Kings county, N.S. Anthracnose was severe on Lloyd George at the Experimental Station, Charlottetown, P.E.I.

YELLOW BLOTCH (virus). Apparently a new virus disease, tentatively named Yellow Blotch on account of the unusual blotchy-yellow character of the mottle, has been transmitted by grafting at the Laboratory farm, St. Catharines, Ont. The original diseased cane was found in 1935 in the Cuthbert variety in a nursery being inspected for certification. (G.C. Chamberlain and G.H. Berkeley)

YELLOW RUST (Phragmidium Rubi-idsai) was general on Cuthbert and Viking on Vancouver Island and the Fraser River valley, B.C., and caused moderate damage. The leaves were injured before the fruit were fully formed, resulting in drier berries and a lower yield. The disease was more

severe than in previous years (W. Jones). It was common on stray plants at the Summerland Station.

LATE YELLOW RUST (Pucciniastrum americanum) was less prevalent in Quebec than in 1935, although a trace was present in most Viking plantings. It was heavy in one plantation of Viking on low ground in Rouville county. Rust was moderate in two commercial plantings in York county, N.B.

POWDERY MILDEW (Sphaerotheca Humuli) was general in Latham plantings in Lincoln county, Ont.; it stunted the growth of the cane tips and the leaves. The extremely hot weather in early July, when the daily maximum was 99-104°F., caused considerable scorching and dropping of affected leaves (G.C. Chamberlain). A slight infection was recorded on Latham at Dunrobin. Powdery mildew was prevalent everywhere in Quebec on Latham. In the 23 nurseries inspected, infection varied from slight to severe. The disease was severe in one fruiting plantation at Shefford. A trace was found on Chief in Rouville county (H.N. Racicot). A slight infection developed on Brighton, Count, and Newman at the Station, Cap Rouge. Traces were observed in a plantation at Kentville, N.S.

VERTICILLIUM WILT (V. sp.) was found in the Hatzig and Victoria districts, B.C., on Cuthbert, St. Regis and Newman varieties. Infection was confined to individual plants or several adjacent plants in the same row. (W. Jones)

Wilt was severe in a 2-year old planting of Cuthbert in Lincoln county, Ont.; it caused a total loss of fruiting canes and a considerable reduction of new canes. The planting was on land previously planted to tomatoes. A slight infection was noted on Viking. (G.C. Chamberlain)

CROWN GALL (Phytophthora tumefaciens) was commonly encountered in nursery plantations when virus-infected plants were being rogued out. It appears to have no adverse effect on growth of cane (G. C. Chamberlain). A single affected plant was found in a planting of Herbert in Queens county, P.E.I.

CANE BLIGHT (Leptosphaeria Coniothyrium) was found in a few plantations on the lower mainland of B.C.

SUN SCALD and SCORCH caused a loss of 50% of crop in early and mid-season varieties of raspberries throughout the Niagara Peninsula, Ont., due to the extreme heat and drought. There was a heavy drop and much sun scald of fruit. .

FROST caused much injury to the young leaves of raspberries on May 16, in York county, N.B.

Armillaria mellea was found attacking and killing many plantations located at Hatzig, Burneby, and Huntington, B.C. respectively (W. Jones).

STRAWBERRY

LEAF SCORCH (Diplocarpon Earliana (Marssonina Fragariae) was moderate on British Sovereign, Red Heart, and Kanner King; slight on New Victoria, and Empire Red, while only a trace or none was found on the remaining 41 varieties being grown at the Experimental Station, Sidney, B.C. It was general on British Sovereign on Vancouver Island and in the Fraser River valley, but the damage was slight (W. Jones). This disease was moderate on strawberries at the Station, Cap Rouge, Que.; Paul and Dick were the worst affected.

LEAF SPOT (Mycosphaerella Fragariae (Ramularia Tulasnei). Only a trace of leaf spot developed on Early Bird, British Sovereign, Clare, Bennett, Wm. Belt, Deutsch Evern, Fairfax, Dorset, Madame Kooi, and Charlie, while infection was moderate to severe on the other 33 varieties under test at the Station, Sidney, B.C. (W. Jones). Diseased specimens were received from Morewood and Oakville, Ont. It was present on all varieties at the Station, Cap Rouge, Que., but Florence and Howard were the least affected (C. Perrault). Leaf spot was present throughout N.B. and was reported to have caused slight to moderate damage in York and Westmoreland counties, N.B. (J. L. Howatt). It was very common in N.S.; infection was slight to heavy.

POWDERY MILDEW (Sphaerotheca Humuli) caused heavy losses in P.E.I. in 1936. The disease was worst in the Montague district where the crop was a failure in several plantings. Nevertheless, fair crops were obtained in well cared-for plantings. (R. R. Hurst)

JUNE YELLOWS (cause undetermined) was observed on Premier and Blackmore in Lincoln county, Ont. The trouble is

fairly common in plantations. The yellowing is often marked and the plants appear stunted, but the damage is negligible. (G. C. Chamberlain)

YELLOW (virus). Up to 75% of the plants were affected in some patches of Blackmore at Kentville, N.S. A few yellowed plants were also found in Jessie, Dunlop, Bennet, and Thompson. (J. F. Hockey)

MOSAIC (virus). A few plants with leaves exhibiting mosaic-like pattern were seen at the Station, Fredericton, N.B.

BASAL ROT (Sclerotinia sclerotiorum) slightly affected a patch in Queens county, P.E.I.

A late FROST caused about half the berries to be misshapen in a plantation in Peel county, Ont. Injury was confined to the part of the plantation covered with buckwheat straw; where other straw was used no damage occurred (G.C. Chamberlain). Frost caused slight injury to strawberry flowers on May 16, in York county, N.B. (S. Clarkson)

Up to 10% of the strawberry plants were winterkilled in some plantations at Keetings, B.C., while up to 30% were destroyed on Lulu Island.

V. DISEASES OF FOREST AND SHADE TREES

WITCHAM HAZEL (Alnus balsamea)

Witches' broom (Melanconium Caryophyllacearum) was reported from Annapolis county, N.S. and Queens county, P.E.I.

BASSWOOD (Tilia americana)

Powdery mildew (Uncinula Clintonii) was collected at Abbotsford, Que.

BEECH (Fagus)

Canker (Nectria coccinea). Beech trees 4 to 6 inches in diameter at Kentville, N.S. bear numerous cankers on the trunk while most of the older trees are dead and small trees are affected but not so severely. (K.A. Harrison)

BIRCH (Betula)

Polynorus velutinus and P. Tulipiferae were collected at Indian Head, Sask., on white birch.

Frost caused severe damage on May 16, to the leaves of birch, butternut, hawthorn, maple, and oak at the Experimental Station, Fredericton, N.B.

ELM (Ulmus)

Black spot (Gnomonia Ulmi) was found causing early leaf drop on several occasions in Lincoln county, Ont. Several trees were affected at Springhill, N.B.

Cephalosporium wilt (Dothiorella Ulmi (Cephalosporium sp.) was found on single trees at two places in N.S. One tree is approximately 30 years old in a row of elms which otherwise appear healthy. When the disease was noticed, twigs were showing dieback from the base to the top of the tree. The other tree is along a highway and is more or less isolated from other elms. Cultures of the fungus were identified by Dr. D.B. Craeger (J. F. Hickey). This is a new disease for Canada, but it has already received some attention in the United States (Goss, R.W. and P.R. Fink, Univ.

Neb. Agr. Exp. Sta. Res. Bull. 70. 1934 and Craeger, D.B., Jour. Arnold Arb. 16:453-454. 1935)

HAWTHORN (Crataegus)

Leaf blight (Fabraea maculata) was reported from Comox, B.C.

Rust (Gymnosporangium clavariaeforme). Traces of rust were found on C. Oxyacantha var. rosea at Charlottetown, P.E.I.

HORSE CHESTNUT (Aesculus)

Leaf blight (Guignardia Aesculi (Phyllosticta Paviae) caused slight defoliation at Kentville, N.S. It caused moderate to severe damage throughout P.E.I.

MAPLE (Acer)

Tar spot (Rhytisma acerinum) was heavy on some trees at the Station, Kentville, N.S. It was also present in P.E.I.

Powdery mildew (Uncinula circinata) was collected on A. saccharum at Chelsea, Que.

Canker (Cytospora sp.) caused slight damage to a tree of A. saccharinum at Saskatoon, Sask.

Wilt (Verticillium sp.) caused some defoliation on one side of 2 trees growing in a yard at St. Catharines, Ont.

Leaf spot (Septoria acerina) slightly infected A. pennsylvanicum on Wood Islands, P.E.I.

Canker (Nectria cinnabarina) affected one small tree of A. pennsylvanicum planted at the Station, Kentville, N.S.

MOUNTAIN ASH (Sorbus)

Canker (Cytospora sp.) following sun scald or winter injury was found causing moderate injury to one of the two trees at Saskatoon, Sask.

Leaf blight (Fabraea maculata) was prevalent on S. occidentalis at Prince Rupert, B.C.

Fire blight (Erwinia amylovora) was severe on young saplings 2 to 3 ft. high at the Station, Morden, Man. The disease was observed on several trees in P.E.I.; it caused severe damage.

OAK (Quercus)

Heart rot (Polyporus obtusus). This polypore was found causing a serious heart rot in 20-30 year old stands of red oak (Q. rubra) at the Petawawa Forest Reserve, Ont.

PINE (Pinus)

White pine blister rust (Cronartium ribicola J.C. Fischer) was observed in York, Sunbury, Charlotte, Northumberland, Gloucester, Queens, and Kings counties, N.B., (J.L. Howatt). Mature aecia were found at Kentville, N.S. on May 1. The disease is gradually killing the older trees. It caused severe damage in P.E.I. (R.R. Hurst). Blister rust is evidently destructive in Bonaventure county, Que. One tree, 10 feet high, which was dying from a multiple infection, bore 13 separate cankers. Trees of the original growth, which have been left standing often bear a typical flag. (I.L. Connors)

P. koraiensis in the Arboretum, Experimental Farm, Ottawa, Ont. was found to be a new host of Lophodermium nitens. The identification was confirmed by Dr. G.D. Barker. (J.E. Bier)

POPLAR (Populus)

Yellow leaf blister (Taphrina aurea). Affected leaves were received from Massett, Graham Island, B.C., where it is apparently general. A light infection was observed on Lombardy poplar (P. nigra var. italica) in Queens county, P.E.I.

Heart rot (Polyporus dryophilus var. vulgaris) was found to be common in a 45-year old stand of P. grandidentata at the Petawawa Forest Reserve, Ont.

Canker (Hymoxylon pruinatum) was common on aspen (P. tremuloides) of all ages up to 65 years at the Petawawa Forest Reserve, Ont. (J.E. Bier)

Canker (Cytospora chrysosperma). Lombardy poplar affected with this canker was received from Grinrod, and

Trail, B.C. It was reported to have killed a number of 6 to 8 year old trees at Trail.

Rust (Melampsora Medusae) was very severe on Russian poplar at the Forestry farm, Indian Head, Sask. It was collected on Northwest poplar (P. balsamifera x deltoides) at the Petawawa Forest Experimental Station, Chalk River, Ont.

RED CEDAR (Juniperus)

Rust (Gymnosporangium globosum) was fairly abundant on J. virginiana (var. ?hibernica) at Abbotsford. Nearby hawthorn were heavily rusted in 1935, but no attempt to collect it was made this year. (H.N. Racicot)

Rust (Gymnosporangium clavipes) was found on the lower limbs on one side of a tree of J. virginiana at Port Dalhousie, Ont. (H.N. Racicot)

SPRUCE (Picea)

Rust (Chrysomyxa ledicola). A severe outbreak was observed at Maryland Hill, N.B. on P. nigra. (J.L. Howatt)

Rust (Chrysomyxa sp.) heavily infected P. canadensis at St. Timothy, P.E.I. Specimens from rusted blue spruce planted at Lakeview House, Portneuf Co., Que., were received at Ottawa on Aug. 24; it had been noted for the past 2 years.

SUMACH (Rhus)

Sphaeropsis Sumachi Cooke & Ellis (= Physalospora obtusa) was found causing a die-back of blossom spurs at Dartmouth and Berwick, N.S. (J.F. Hockey)

WALNUT

Bacterial blight (Phytophthora Juglandis) caused about 20% damage to the fruits and leaves of English walnut in the orchard at the Station, Sidney, B.C.

WILLOW (Salix)

Tar spot (Rhytisma salicinum) slightly infected willows at Oxford, N.S.

Powdery mildew (Uncinula Salicis) was slight at Gillam (Hudson Bay Railway, mile 325.7), Man. It was collected on S. cordata at St. Pie, Que.

Rust (Helianthella ?Abietis-cauracearum) moderately infected willows at Gillam, Man.

Scab (Phusicladium saliciperum) was severe from Levis to Rimouski, Me., especially between Ste. Anne de la Pocatiere and Riviere Ouelle. In this more limited section, the foliage of nearly all the trees dried up in July. A few trees among the diseased were apparently resistant as they showed no sign of injury from scab (C. Perrault). It was also observed at several points along the highway between Levis and Ste. Angele de Laval, opposite Three Rivers, and at Louiseville, nearly 25 miles west of Three Rivers, where several large trees were browned by the disease (C. G. Riley). Scab caused more damage in 1936 than it has in recent years in N.B. Several ornamental varieties of willow at the Fredericton Station, which had previously escaped, were severely affected this season (J. L. Howatt and S. Clarkson). Scab was more destructive throughout the Annapolis valley, N.S. than at any time since 1926. Trees with three-quarters of their foliage dead were common throughout the summer. Weather conditions favoured the early appearance of the disease. (K. A. Harrison)

Black canker (Physalospora Miyabeana) was not as evident as scab during the past summer in Kings county, N.S., but it was present on most trees. It was quite common in the Caspereaux valley. (K. A. Harrison)

Canker (Stereum purpureum). Part of the trunk of a weeping willow tree was dead and thereon the fungus was fruiting at the Station, Kentville, N.S. (K. A. Harrison)

VI. DISEASES OF ORNAMENTAL PLANTS

ASTER

Rust (Coleosporium Solidaginis). A trace of rust was found on A. novae-angliae at Lennoxville, Que.

BARBERRY (Berberis)

Stem rust (Puccinia graminis) was first found on May 18, at Ottawa, Ont., slightly infecting a common barberry bush. On June 20 the infection was heavy and the aecia were still discharging spores, although most of them were now old. Rust was general on bushes of the common barberry on July 1, at Charlottetown, P.E.I.

BELL FLOWER (Campanula)

Rust (Coleosporium Campanulae) was heavy on the leaves and moderate on the stems of C. persicifolia in a garden in Vancouver, B.C. (3978); it caused considerable dwarfing of the plants, but did not prevent them flowering. All plants of this variety, whatever their location, were rusted, but C. cochlearifolia, C. glomerata, C. planiflora and C. rotundifolia were not affected (J. W. Eastham). This is the first record of its occurrence in Canada, but it is known on the same host in California. Physiologic specialization has been reported in the species in Europe (Sydow, Monographia Ured. 3:631. 1915) and may be the explanation of its failure to attack the other species of Campanula.

Frost caused some damage to the younger leaves of bell flower at Fredericton, N.B. on May 16. Similar injury by frost was also observed on columbine, cowslip, golden glow, hollyhock, honeysuckle, hydrangea, larkspur, and phlox; both leaves and buds of the lilac were damaged.

BUCKTHORN(Rhamnus)

Rust (Puccinia coronata). Aecia were abundant on the European buckthorn in the Arboretum, Ottawa, Ont., on May 26, and spores were still being discharged on June 20. A moderate infection was noted on June 17 at Charlottetown, P.E.I.

BUTTERFLY FLOWER (Schizanthus)

Yellows (virus) slightly affected 3 plants in the border at the Station, Fredericton, N.B.

BRACHYCOME

Yellows (virus). A single affected plant was seen in the border at the Fredericton Station, N.B.

CANDY TUFT (Iberis)

Yellows (virus) was present on 2 plants at the Station, Fredericton, N.B.

CALENDULA

Yellows (virus) was severe on 2% of the plants in the border at the Fredericton Station, N.B.: it was common and caused moderate damage on Calendula in gardens in the city (D.J. MacLeod). It was common and severe in most gardens about Charlottetown, P. E. I. (R.R. Hurst)

CANTERBURY BELLS (Campanula medium)

Stem rot (Sclerotinia sclerotiorum) destroyed a group of these plants in a garden in Charlottetown, P.E.I.

CARAGANA

Leaf spot (Septoria Caraganae) caused slight damage at Saskatoon, and Indian Head, Sask. Infection was moderate at Winnipeg, Man.; it was less severe than in 1935.

CARNATION (Dianthus)

Rust (Uromyces caryophyllinus) was moderate on plants in the greenhouse at the Station, Kentville, N.S. on Feb. 7.

CHINA ASTER (Callistephus)

Wilt (Fusarium conglutinans var. Callistephi) affected 2 plants in a plot at the Summerland Station, B.C. It

killed several plants of Balls White, while it was not observed on other varieties at the Lacombe Station, Alta. A slight infection was present in the beds at the Ste. Anne de la Pocatiere Station, Que.; it killed a few plants.

Stem rot (Sclerotinia sclerotiorum). A single diseased plant was seen at the Summerland Station, B.C.

Yellows (virus) affected 1% of the plants at the Station, Summerland, B.C. A yellowed plant was found here and there at the Station, Morden, Man. Yellows affected a trace to 1% of plants in gardens in Lincoln county, Ont. The disease was common and severe in York, Sunbury, and Charlotte counties, N.B.

Rust (Coleosporium Solidaginis) moderately infected the leaves and stems in a garden in Kings county, N.S.

CHRISTMAS ROSE (Helleborus niger)

Leaf spot (Coniothyrium Hellebori) occurred on a few plants in the rockery at the Station, Sidney, B.C.

CHRYSANTHEMUM

Leaf spot (Septoria macrospora Dearn.) was slightly infecting chrysanthemums in the Horticultural greenhouses, Ottawa, Ont. in Feb. 1937.

CLARKIA

Grey mould (Botrytis cinerea) was very conspicuous on the seed pods at the Experimental Farm, Nappan, N.S.

COLEUS

Yellows (virus) was slight on 2 plants in the border at the Station, Fredericton, N.B.

CLEMATIS

Septoria leaf spot (S. Clematidis). A trace was found on C. ligustifolia.

COLUMBINE (Aquilegia)

Leaf spot (Clasterosporium tenuissimum) was collected at Ottawa, Ont. (F.S. Thatcher)

Leaf spot (Septoria Aquilegiae) was collected at Abord à Plouffe, Que. in 1934.

Foot rot (Fusarium and other fungi isolated). Affected plants were drying up at the Station, Scott, Sask. on June 27.

COREOPSIS

Wilt (Fusarium sp.). One plant was wilted at the Station, Summerland, B.C.

Yellows (virus) affected 3% of the plants in a garden at Fredericton, N.B.

DAHLIA

Stunt (virus) was prevalent on many varieties of dahlia at Charlottetown, P.E.I. In a commercial planting of about 4,000 plants belonging to 500 varieties of dahlias in Lincoln county, Ont. Ten per cent of the plants were affected with either stunt or Mosaic (virus). Out of 245 plants in the garden of the Park Commission, Niagara Falls, 73 were affected with mosaic, 24 with stunt and 5 with ring spot. A trace of mosaic was seen at the Station, and in a city garden, Fredericton, N.B.

EVERLASTING (Helichrysum)

Yellows (virus) slightly affected 1.5% of the plants in the border at the Station, Fredericton, N.B.; it was also found in a garden in the city.

FIRETHORN (Pyracantha)

Scab (Fusicladium Pyracanthae) was general on Vancouver Island and in the Fraser River valley, B.C.

FLOWERING CRABAPPLE (Pyrus)

Rust (Gymnosporangium clavipes). Rusted specimens were received from Campbellford, Ont., at the Ottawa Laboratory.

GAILLARDIA

Yellows (virus) was slight on 1% of the plants in the border at the Station, Fredericton, N.B.

GLADIOLUS

Bacterial blight (Phytophthora gummisudans) was severe on some varieties at Winnipeg, Man.

GODETIA

Rust (Pucciniastrum Epilobii) was moderate to severe at Abbotsford, Que., on about a dozen plants of G. amoena (3910), which appears to be a new host for the rust. The rust was severe on G. grandiflora at the Station, Charlottetown, P.E.I. (4481). It is also known on the latter host from Edmonton, Alta. (2591), Saskatoon, Sask. (4065) and in Man. (Bisby et al., Fungi of Manitoba p. 87, 1929). In Dec. 1936 (P.D. Reporter 21: 10. Jan. 15, 1937) it was found on Clarkia elegans in a greenhouse at Ithaca, N.Y.

HOLLYHOCK (Althaea)

Rust (Puccinia Malvacearum) was severe on Cutleaf, while it was slight on other varieties at the Summerland Station, B.C.; a slight infection occurred at Winnipeg, Man.; rust was general but moderate at Farnham, Cap Rouge, and Ste. Anne de la Pocatiere, Que.; it was widespread in N.B. and caused severe damage in many gardens; it was severe in several gardens at Kentville, N.S. Rust was severe in P.E.I.; fair control of rust was obtained with Bordeaux mixture, especially when a casein sticker was added, although the spray did disfigure the foliage. (G. Ayers)

Mosaic (virus). Mosaic symptoms have been observed on a plant for several years at Charlottetown, P.E.I.; damage is not apparent. (R.R. Hurst)

Leaf spot (Ascochyta althaeina) caused moderate damage in gardens about Charlottetown, P.E.I.

HONEYSUCKLE (Lonicera)

Powdery mildew (Microsphaera Alni) was moderate at the University, Saskatoon, Sask. and at Farnham, Que.

Blight (Glomerularia Lonicerae) was moderate to severe on L. tatarica, while none or traces occurred on other species and varieties at L'Assomption, Que. A severe outbreak occurred at the Westfield Golf Club, near St. John, N.B.

HYDRANGEA

A few limbs on one shrub were found affected with Nectria cinnabarina at Kentville, N.S.

IRIS

Leaf spot (Didymellina macrospora) Heterosporium gracile was recorded as follows: general and moderately infecting iris on Vancouver Island and the lower mainland, B.C.; severe in patches at the Station, Summerland; slight at Indian Head and moderate at Wynyard, Sask.; slight on Parisiana, Medrano, Bridesmaid, and Deba at Morden, Man.; infection lighter than in 1935; on leaves received from Calville, Ont.; general but light at Ste. Anne de la Pocatiere and Cap Rouge, Que.; moderate to severe at the Station, Fredericton, N.B.; prevalent and severe in gardens at the Station, Kentville, N.S.; very common in 1936 at Charlottetown, P.E.I.

Rust (Puccinia Iridis) was heavy on Gladwin Iris (I. foetidissima) at Charlottetown, P.E.I. The rust is reported on this host in Europe.

Rhizome rot (Bacillus carotovorus) affected about 1% of the plants in a garden in Queens county, P.E.I.

Belworm (Ditylenchus dipsaci (Kuhn 1858) Filipjev 1936) is present in most of the plantings on Vancouver Island, B.C. It cannot, however, be detected until after the bulbs are lifted.

LARKSPUR (Delphinium)

Powdery mildew (Erysiphe Polygoni) affected only some varieties at the Station, Summerland, B.C.; a moderate infection occurred at Winnipeg, Man.; it was moderate on all varieties at the Stations at Cap Rouge and Ste. Anne de la Pocatiere, Que., and on a few plants at Lennoxville.

Bacterial blight (Phytophthora Delphinii) was conspicuous in a florist's nursery at North Vancouver, B.C., but it did

not appear to be serious; it caused severe damage in a garden in zone 8, Alta.; the lower leaves were moderately to severely blighted at Lennoxville, Que.; the disease was prevalent and destructive in gardens in York and Sunbury counties, N.B.; several clumps were seriously affected on May 11 at Kentville, N.S.; it was found on a single plant in a garden in Queens county, P.E.I.

Yellow dwarf (?virus) affected a few plants at the Station, Summerland, B.C.

LILAC (Syringa)

Powdery mildew (Microsphaera Alni) was slight at Farnham, Que.; severe on a hedge at Rathesay, N.B.

Blight (Phytomonas Syringae) was severe on several hedges about Fredericton, N.B., and was noted once at St. John.

Grey mould (Botrytis cinerea) was severe as a twig blight on a hedge near St. John, N.B.; it was associated with bacterial blight. It was severe as twig and a leaf blight about Charlottetown, P.E.I.

Mosaic (?virus). A mosaic-like disease was noted in a garden at Fredericton, N.B.; affected plants were stunted. (J.L. Howatt)

Chlorosis (cause undetermined) was striking on lilac at the Station, N.B., and specimens showing a similar chlorosis were received from Halifax, N.S. (D.J. MacLeod)

LILY (Lilium)

Mosaic (virus) affected 80% of the Easter Lily plants in a greenhouse at the Dale Estate, Brampton, Ont. The foliage was yellowed, the growth stunted, and on the same plants, the bloom was blasted. Root rot was also present (G.H. Berkeley).

LUPINE (Lupinus)

Powdery mildew (Erysiphe Polygoni) was severe at the Station, Summerland, B.C.

Foot rot and blight (Fusarium sp.) was severe on one in a garden at Saskatoon, Sask.

MALTESE CROSS (Lychnis)

Leaf spot (Phyllosticta Lychnidis) moderately infected L. chalconica at Farnham, Que.

MARIGOLD (Tagetes)

Yellows (virus) was severe on marigolds at the Station, Fredericton, N.B.

MEZEREUM or FEBRUARY DAPHNE (Daphne mezereum)

Leaf spot (Gloeosporium mezereum Cooke) was found on this host in nurseries (3842), private gardens, and on the University campus at Vancouver, and in one large nursery at Victoria, B.C. The more severely infected plants were completely defoliated in late summer. A comparatively slight infection on a leaf was apparently sufficient to cause its fall. D. cneorum growing within a few feet of infected D. mezereum showed no signs of the disease, (J.W. Eastham). The pathogen agreed well with the description given for G. mezereum by Cooke. This is the first record of its occurrence in Canada and probably for the U.S.A. (I.L. Conners)

MINT (Mentha)

Rust (Puccinia Menthae) was severe on material received from Waterville, N.S. (D. Savile)

NARCISSUS

Leaf scorch (Stagonospora Curtisii) was widely distributed on Vancouver Island, B.C., but the damage was negligible. (R.J. Hastings)

White mould (Ramularia vallisumbrosae) caused severe injury to a commercial planting of Phoenix on Vancouver Island, B.C. It was also found on Lucifer, Ornatus, and Phoenix in garden plantings. (R.J. Hastings)

Smoulder (Botrytis narcissicola) was widely distributed on Vancouver Island, B.C., but in general the damage was a trace. Only the early varieties, Golden Spur and Obvallarius, suffered serious injury when the bulbs were 3 or more years old; up to 40% might then be infected (R.J. Hastings).

It was also found on several imported bulbs intercepted at Vancouver. (J.W. Eastham)

Eelworm (Ditylenchus dipsaci) was found in 8 plantings on Vancouver Island, B.C.; infestation ranged from a trace to 50%. However, where control measures have been adopted, infestation is decreasing while it was heavy where no attempt has been made to control the pest. (R.J. Hastings)

Root eelworm (Anguillulina pratensis) was found in 2 plantings on Vancouver Island, B.C. The bulbs in the affected areas were markedly stunted due to root decay. (R.J. Hastings)

PANSY (Viola)

Powdery mildew (Sphaerotheca Humuli) was moderate at Saskatoon, Sask., and moderate to severe at Lennoxville, Que.

PEONY (Paeonia)

Blight (Botrytis Paeoniae) caused a general but slight leaf spotting at Morden, Man.; it caused slight damage to the buds on about 100 varieties at the University, Saskatoon, Sask. It was severe in one garden at Ste. Anne de la Pocatiere; it was present at Cap Rouge, Que. on all varieties, but it caused slight damage. Late flower buds failed to open unless they were protected by a chemical spray. (C. Perrault). Blight was prevalent in gardens in York county, N.B., but infection was slight at the Fredericton Station, for the disease was effectively checked by spraying with 2-2-40 Bordeaux (J.L. Howatt and S. Clarkson). The disease was severe on the buds, leaves, and stems in several clumps at the Farm, Nappan, N.S. It was also seen in many parts of the province. (J.F. Hockey)

Ring spot (virus) was present on 1 or 2 plants at the University, Saskatoon, Sask.; it was much less evident than in 1935; 3 plants out of 15 were affected at Farnham, Que.

Bud blight (cause unknown). About 50% of the buds failed to open fully at the University, Saskatoon, Sask. No sign of fungus infection was present. However, thrips were seen on all blighted buds. This disease was definitely confined to certain varieties.

Root knot (Heterodera marioni) was severe on several varieties recently introduced at the Station, Charlottetown, P.E.I.

Leaf blotch (Cladosporium Paeoniae) was moderate to severe on the leaves and flowers at Hudson Heights, Que. in 1934.

PETUNIA

Late blight (Phytophthora infestans). Traces were seen in a garden at Charlottetown, P.E.I.

Yellows (virus) severely affected 1% of plants in a garden at Fredericton, N.B.

PHLOX

Yellows (virus) was severe on 2% of the plants of P. Drummondii at the Station, Fredericton, N.B. It was common in gardens in York and Sunbury counties. The disease was severe on 2-5% of perennial phlox plants in the border at the Fredericton Station. It likewise was prevalent on this plant in York, Sunbury and Carleton counties. (D.J. MacLeod)

Powdery mildew (Erysiphe Cichoracearum) was severe on a few plants at Powell River, B.C., and at the Summerland Station. It was present at Lennoxville, Que., and caused slight damage at Cap Rouge.

RHODODENDRON

Leaf spot (Pestalotzia Rhododendri (D. Sacc.) Guba) caused moderate injury to plants at Spencerwood, Quebec City, Que. (A.J. Hicks)

ROSE (Rosa)

Rust (Phragmidium spp.) was severe on Lady Ashton, but none was present on the other varieties at the Summerland Station, B.C. Rust (P. speciosum) was severe on Betty Bland at Saskatoon, Sask.; it caused slight damage on leaves and branches of roses at Indian Head. Slight to moderate infections of rust were found at Ste. Anne de la Pocatiere, St. Vallier; St. Roch des Aulnaies (P. subcorticiium), and Abbotsford, Que. (P. americanum). Both wild and cultivated roses were heavily infected in York and Sunbury counties, N.B. Rust (P. americanum) affected several of the bushes at the Station, Kentville, N.S. Rust (P. subcorticiium) was found at Charlottetown, P.E.I.

Black spot (Diplocarpon Rosae (Marssonina Rosae) was general and caused slight damage on Vancouver Island and on the lower mainland of B.C. It caused slight to moderate damage at Indian Head, Sask., and slight damage at Saskatoon; it was less prevalent than in 1935. It was found in many gardens causing much defoliation in Lincoln county, Ont.; the following hybrid tea varieties were found seriously affected: Claudius Pernet, Dame Edith Helen, Heinrich Garde, Independence Day, Los Angeles, Mrs. A.R. Barraclough, Mrs. Chas. Lamplough, Mrs. M. Steward, Rev. F. Page-Roberts, and Talisman, while others were apparently resistant: Covent Garden, Dainty Bess, Elizabeth of York, E. J. Ladding, Hadley, Lady Ashtown and General-Superior Arnold Jansen (G.C. Chamberlain). The roses were partly defoliated by black spot at the Station, Fredericton, N.B.

Powdery mildew (Sphaerotheca pannosa) was general and caused slight damage on Vancouver Island and on the lower mainland of B.C. It was very prevalent on Crimson Rambler and the hybrid teas, General-Superior Arnold Jansen and Talisman, in Lincoln county, Ont. It was common on Rosa rugosa at Abbotsford, Que., in September. A severe outbreak occurred in a garden at Devon, N.B., but it was effectively controlled by sulphur dusting. Unsprayed rambler bushes were all affected in a garden at Kentville, N.S.; it was also observed in many other gardens. Rambler roses were already moderately affected on July 13 in a garden at Charlottetown, P.E.I.

Discosia artocreas was found on over-wintered leaves at Saskatoon, Sask. on May 5.

Leaf spot (Cercospora rosicola) slightly infected roses at Morden, Man.

Crown gall (Phytoplasma tumefaciens) was found on one Rosa rugosa bush at L'Assomption, Que.

Canker (Valsa ambiens) was found slightly affecting Betty Bland in the University garden, Saskatoon, Sask.

Infectious Chlorosis (virus). Diseased material of Hollywood, a new variety, was sent from a greenhouse at Port Dover, Ont., to the St. Catharines Laboratory. (G.C. Chamberlain)

Mosaic (virus) was severe on 25% of the plants in a commercial garden at Fredericton, N.B. (D.J. MacLeod)

SHASTA DAISY (Chrysanthemum maximum)

Leaf spot (Septoria Chrysanthemi Allescher) caused severe damage to certain varieties at North Vancouver, B.C. (J.W. Eastham). It was also reported from Victoria. This is apparently the first record for Canada.

SNAPDRAGON (Antirrhinum)

Rust (Puccinia Antirrhini) was widely distributed and appeared earlier than usual on Vancouver Island and the lower mainland of B.C. It was first observed in early July, but it became general in August. Sprays containing copper are most effective in the control of the disease, but sulphur sprays give poor results. Observations indicate that infection is initiated by over-wintered inoculum. Where sanitary measures have been rigidly applied, the infection does not occur or it develops late (W. Jones and W. R. Foster). Rust was severe at the Station, Summerland, and at Winnipeg, Man.

Yellows (virus) caused slight damage on 1% of the plants in the border at the Station, Fredericton, N.B.

SNOWBALL (Viburnum)

Grey mould (Botrytis sp. of the cinerea type) was found blighting snowball at Liverpool, N.S.

SNOWBERRY (Symphoricarpos)

Leaf spot (Sphaceloma Symphoricarpi) was severe on 2 bushes of S. alba at Abord a Plouffe, Que. in 1934, and caused premature defoliation.

SPIKE SPEEDWELL (Veronica spicata)

Powdery mildew (Sphaerotheca Humuli) severely infected the plants in a flower bed at the University, Saskatoon, Sask.

Yellows (virus) affected a single plant in the border at the Station, Fredericton, N.B.

STATICE

Yellows (virus) was slight on 2 plants at the Station, Fredericton, N.B.

STOCK (Matthiola)

Foot rot (Fusarium avenaceum (Fr.) Sacc.) caused severe damage to stocks at Ottawa, Ont., grown from imported seed. The disease was very severe on Beauty of Nice and severe on Blood Red, Canary Yellow, Crimson, White, Crimson King, Light Blue, Monte Carlo, Rose, Purple, Cote d'Azur, Dark Blue and Parma Violet, while little or none developed on Yellow and Mont Blanc. It practically wiped out the 20 plants in a bed at Lennoxville, Que. Cultures of the fungus secured from affected plants from both places were identified by Dr. W.L. Gordon as F. avenaceum. (H.N. Racicot and F.S. Thatcher)

SUNFLOWER (Helianthus)

Wilt (Sclerotinia sclerotiorum) affected one plant of an ornamental sunflower at the Station, Summerland, B.C. It was also severe on H. californicus at Charlottetown, P.E.I.

Rust (Puccinia Helianthi) was moderate to severe on the lower leaves of an ornamental sunflower at the Station, Swift Current, Sask.

SWEET PEA (Lathyrus)

Powdery mildew (Microsphaera diffusa) severely infected sweet peas at Saskatoon, Sask. It was slight to moderate on sweet peas at the Station, Lennoxville, Que. It moderately infected all varieties grown about Charlottetown, P.E.I.

Mosaic (virus) was severe on about a third of the plants in a 100-foot row in a garden, Lennoxville, Que.

Streak (Erwinia Lathyri) was prevalent about Charlottetown, P.E.I., it caused slight to very severe damage.

Root rot (Fusarium spp.) moderately to severely infected sweet peas at Winnipeg, Man.

Root rot (cause undetermined) is becoming increasingly prevalent in gardens in York county, N.B. (J.L. Howatt)

TULIP (Tulipa)

Blight (Botrytis Tulipae). In general, infection was slight on Vancouver Island, B.C., in plantings where infected

plants were rogued out when it first appeared. Where diseased plants were not removed early, spores of the fungus were widely distributed and the flower crop was ruined during a wet spell at the time of full bloom. (R.J. Hastings)

Blight was also general at Salmon Arm. A moderate infection was reported at Winnipeg, Man. A scattered infection was noted in several tulip beds of the Corporation of St. Catharines, Ont. Blight was general and caused severe damage, especially in older plantings, at Charlottetown, P.E.I.

Break (virus) was prevalent in 10 plantings on Vancouver Island, B.C., but in most beds less than 1% of the tulips were diseased. The highest infections recorded were: Yellow Prince, 74%; Whistler, 50%; and Bartigon, 30% (R.J. Hastings and W. Jones). Isolated cases of break were observed in gardens in Lincoln county, Ont. In an experiment at the St. Catharines Laboratory in which bulbs supplied from the Station at Sidney, B.C., were used, the percentage of break was as follows: Bronze Queen, 14.8%; Blue Amiable, 76.1%; Pride of Harlem, 0; Le Herveille, 0; Farncombe Sanders, 96.9%; and Clara Butt, 0. (G.C. Chamberlain)

Penicillium rot (Penicillium sp.). About 260 bulbs of Roi d'Islande failed to appear above ground in 2 beds in Lincoln county, Ont. Investigation revealed that the bulbs were affected by soft rot, lacked a root system except for a few discoloured rootlets, and were covered with Penicillium. (G.C. Chamberlain)

VIRGINIA CREEPER (Ampelopsis)

Powdery mildew (Uncinula necator) moderately infected a Virginia creeper in Westboro, Ont. in 1934.

Cercospora leaf spot (C. Ampelopsidis). A trace was found at Morden, Man.

WALL FLOWER (Cheiranthus)

Downy mildew (Peronospora Cheiranthi) was general in several gardens at Victoria, B.C.

YUCCA

Leaf spot (Coniothyrium concentricum) was present on all plants in the gardens at the Station, Kentville, N.S.

ZINNIA

Stem rot (Sclerotinia sclerotiorum) affected 5% of the plants at the Station, Summerland, B.C.

Wilt (Fusarium spp.). Ten per cent of the plants were diseased in the border at the Station, Summerland, B.C. It was also observed at Grand Forks. A few diseased plants were noticed at the Station, Cap Rouge, Que.

Powdery mildew (Erysiphe Cichoracearum) was slight at Summerland, B.C. It was common in gardens in Lincoln county, Ont. late in the season.

Yellows (virus) slightly affected 1% of the plants in a garden at Fredericton, N.B.

Grey mould (Botrytis sp. of the cinerea type) caused moderate damage as a rot of zinnia seedlings in a planting at Charlottetown, P.E.I.

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